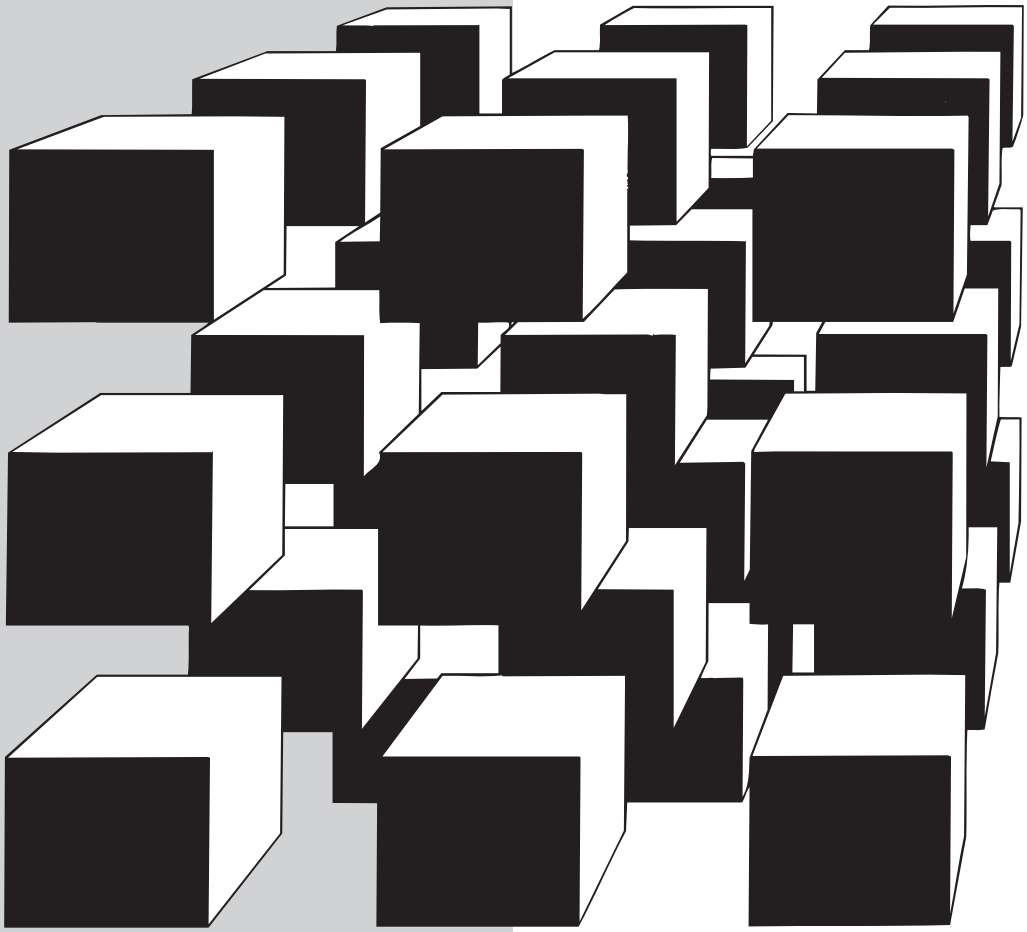
Energy Conservation Accomplishments: 1977-2002

Evaluation Unit
Energy Management
Services Division
2003



Seattle City Light

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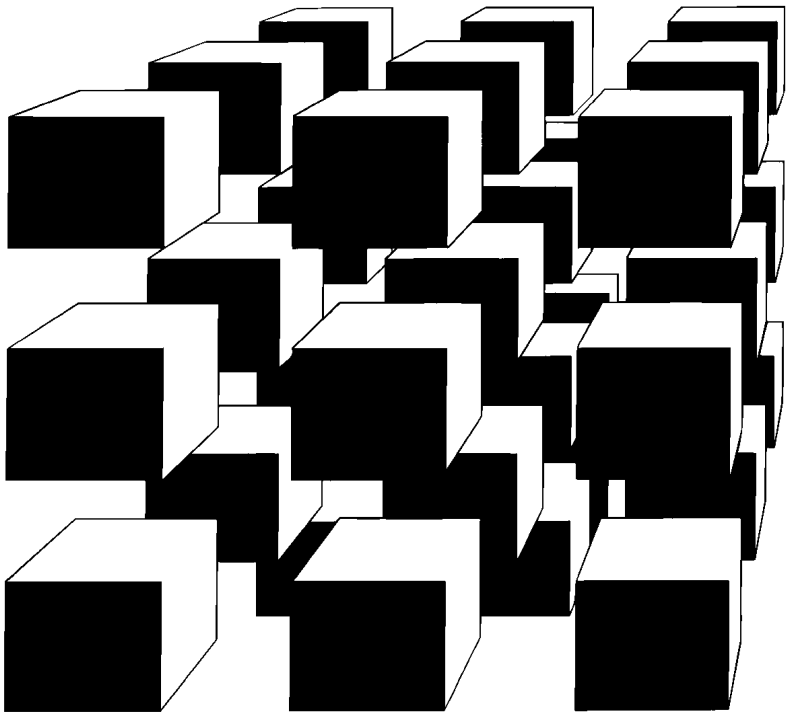

Debra Tachibana, EDITOR
& Dennis Pearson

Seattle City Light

This report is intended for use by City of Seattle departments for purposes of accountability and planning. Information presented in this report may be quoted in the stated form. Any **calculations** made from these data **must be reviewed and approved** by the Energy Management Services Division, Seattle City Light, prior to publication in **any other** document or medium.

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Seattle City Light

The lowest cost, most reliable electricity in urban America

Publicly owned

Stewards of our environment

The Energy Management Services Division:

Bringing energy efficiency into every home and business in Seattle

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A Few Fast Facts About Conservation

Conservation Programs Save Energy

Seattle City Light has operated conservation programs for 26 years, since 1977.

In 2002, conservation reduced City Light's electric system load by ***10%*** (102 average megawatts, or 850,000 megawatt-hours).

These savings accrued from still-active measures installed during 1982-2002.

That is enough electricity to power 82,300 Seattle homes—about ***one-quarter*** of the residential service area.

If all the City Light program energy savings acquired since 1977 were available today, we could power the homes of ***two*** cities the size of Seattle.

Energy savings first put into production in 2002 were ***73.9*** gigawatt-hours.

Conservation Programs Cut CO_2 Emissions

Avoided energy production in 2002 reduced the release of carbon dioxide into the atmosphere by over 300,000 tons.

That is equivalent to ***1 of 5*** service area households garaging a vehicle for the year.

And this impact will continue for the next 18 years, as long as installed measures keep saving energy.

Conservation Customers Save on Electric Bills

From 1977-2002, program participants have saved $310 million on bills.

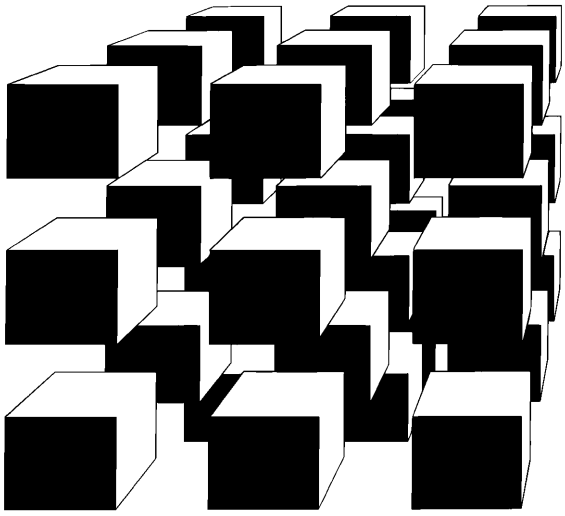
Half of these cost savings went to residential customers.

In 2002, conservation customers reduced their City Light bills by $53 million.

Seattle City Light Customer Statistics

	Average Number of Customers	Megawatt-hours Sold	Average Seattle Rate per kWh	Average National Rate per kWh
Residential	327,127	3,045,768	6.90¢	8.43¢
Commercial	31,418	3,872,749	6.20¢	7.93¢
Industrial	263	1,165,532	5.28¢	4.84¢
Government	1,864	839,081	6.04¢	6.60¢
Total	360,632	8,923,130	6.30¢	7.21¢

Service Area: 131 sq. miles **Population:** 711,000 **Personnel (FTEs):** 1,618



We should measure the performance of DSM programs in much the same way, and with the same competence and diligence, that we monitor the performance of power plants.

Eric Hirst, in *Measuring Performance: Key to Successful Utility Demand-Side Management Programs,* Oak Ridge National Laboratory, 1990

Introduction

The City of Seattle has actively pursued energy conservation as an alternative to new generation development for 26 years, since 1977. The City's municipally owned electric utility, Seattle City Light (*City Light*), has developed and implemented conservation programs and policies to increase the efficiency of electricity use in homes and businesses. These programs provide to customers conservation information and financial incentives that encourage them, for example, to insulate their homes, install energy efficient water heaters and appliances, or install efficient lights in commercial and industrial establishments. Regulations are part of Seattle's conservation efforts; Seattle maintains an energy code for new residential and commercial construction.

In 2002 the Energy Management Services (EMS) Division continued progress toward energy savings goals. Working with customers and trade allies, Seattle City Light authorized new acquisition of 7.0 aMW in 2002 (74% of the 9.47 aMW annual goal). This is enough energy to power about 5,630 Seattle homes each year for the next 18 years, while measures remain active. In addition to reducing customer energy bills, these savings benefit the environment. Conservation delays the need for new power plants, reducing air pollution and greenhouse gas emissions (specifically carbon dioxide) from alternative fossil-fueled power plants. It would take 5,040 vehicles (each driving 10,000 miles and getting 20 mpg) to emit carbon dioxide gas into the atmosphere equal to that saved by City Light conservation programs in 2002, and these savings will continue for another 18 years on average.

2002 Awards and Recognition

City Light and the Energy Management Services Division periodically receive recognition from various professional, industry, and governmental bodies for exemplary accomplishments in conservation acquisition and leadership. During 2002 the following awards were received.

For Conservation Programs: *Exemplary Programs Award* from the American Council for an Energy Efficient Economy.

For Global Warming Response: *2002 International Climate Protection Award* from the U.S. Environmental Protection Agency.

For Sustainable Urban System Design: *Energizing America's Cities Award* from the Gas Technology Institute / International Competition for Sustainable Urban System Design.

For Innovation in Marketing: *'Pitching in to Save' Campaign with the Seattle Mariners* from Energy Services Professionals International.

Evaluation Reporting

In 1980, Seattle City Light established an evaluation capability to provide information on conservation program energy savings, cost-effectiveness, and operational efficiency. Since that time, nearly 150 evaluation studies have been completed (see BIBLIOGRAPHY). These studies have been performed after programs have been operating approximately six months to two years.

Evaluators ensure that the energy savings counted as programmatic savings are truly due to program effects and not due to other factors such as customers' response to the increasing price of electricity, other sources of conservation information, or year-to-year weather variations. Thus, whenever possible, savings are calculated by comparing the change in electricity use of program participants with that of a group of nonparticipating customers or a control group.

In addition, City Light measures the performance of programs in the midst of delivering energy management products and services. Evaluators have surveyed City Light customers to assess customer satisfaction, to gather information that will assist in the development of effective marketing strategies, and to verify electricity savings calculations. Where relevant data have been available, evaluators have also used the evaluation results from similar programs operated by other utilities. This is done for purposes of comparison or benchmarking, and sometimes to adjust estimates of City Light's program savings.

The Evaluation Unit has been publishing the annual *Energy Conservation Accomplishments* report for 21 years. Each year has seen expansion and improvement in the report.

Purpose and Organization of Report

The *Energy Conservation Accomplishments* report is an annual monitoring and performance measurement report, not an evaluation of programs. It compiles detailed performance data for all of Seattle City Light's conservation efforts since 1977, both active and discontinued programs. Currently this document includes data on the following:

- Program descriptions
- Program participation
- Energy savings and average load reduction
- Estimated lifetimes of energy savings
- Program expenditures
- Bonneville Power Administration (BPA) and other funding
- Documentation of information sources and calculations

The supporting documentation, presented in hundreds of footnotes, is a major strength of this report. It allows the serious user to probe into the sources of data or estimates, any necessary adjustments, assumptions made, and other contextual comments.

While this report includes the best data available for annual calendar-year tracking and evaluated energy savings, it is not a substitute for rigorous evaluation studies, especially in the collection, interpretation, and utilization of cost data. The municipal financial accounting systems used for most cost reporting have been awkward tools for capturing itemized program-specific expenses, and to assign them to the appropriate calendar year (many budget and contract funds are carried over from one year to the next). While there is an attempt to assign costs and savings to the year in which they occur, for some programs this is difficult. In new construction, for example, the financial incentives may be paid a year or more before a facility is constructed and savings start to accumulate. Another financial tracking dilemma has occurred in residential weatherization loan programs where the tracking systems report the total cost of the job, not just the portion financed by Seattle City Light. Repayment of loans is made to a City account that is not tracked by program or budget year.

For these and other reasons, the reader is strongly advised NOT to use the cost data in this report to attempt calculation of program cost effectiveness. Inappropriate use of expenditure data could lead to significant errors in comparisons across programs.

The information presented in this edition of the *Energy Conservation Accomplishments* report supersedes that of earlier editions. As new data were added for 2000-2002, revisions were made in reports of program participation, energy savings, expenditures, and funding for earlier years. **Users are advised to consult new values for 1993 through 2002 in particular.**

This report is divided into five sections. The remainder of SECTION I presents a summary of the electricity savings and expenditures for conservation programs from the start of the programs through 2002. The information provided on each program in SECTIONS II–V includes descriptions of the program and population served, conservation measures, participation, electricity savings, load reduction, expenditures, and outside funding. SECTION II summarizes information for active programs in the residential sector, while SECTION III provides comparable data for the commercial and industrial sectors. SECTION IV contains information on residential programs that have been discontinued or replaced. While these programs are no longer operating and incurring costs, many continue to produce electricity savings. Similarly, inactive commercial and industrial programs are described in SECTION V. This report ends with a BIBLIOGRAPHY listing selected reports on energy program evaluations completed by the Evaluation Unit over the past 21 years.

Information Sources and Terms

The main sources of expenditure data are cost ledger reports (1977-1990); City Light Management Information System–MIS reports (1977-1990); Seattle Financial Management System–SFMS reports (1990-1999); and SUMMIT financial system reports (1999-2002). Other sources of information, such as planning documents, were consulted on specific programs. The primary sources of information for electricity savings are evaluation reports produced or commissioned by the Evaluation Unit.

Several programs experience a lag of one or more years before authorized and contracted conservation savings are put into service. Tables in the **Electricity Savings** portion of entries for several programs described authorized/contracted projects as well as completed projects. These programs include Built Smart / Long-Term Super Good Cents, Multifamily Conservation Programs, Energy $avings Plan, Energy Smart Design, Energy Smart Services, and $mart Business. The first table in each entry depicts projects contracted by City Light during the calendar year. This table describes the potential energy savings that will be realized when the projects are completed. The second table in each entry for these programs continues to describe savings realized from projects completed during the calendar year.

Note that the energy savings (both MWh and aMW) reported in both tables reflect savings from current year participants as well as savings in that year from all prior participants for whom the measure lifetime has not yet expired. For a description of first-year savings from current year participants only, see the referenced footnotes in each program entry.

Following are definitions for some energy savings terms used throughout this report.

Measure Lifetime: The active lifetime of measures is expressed in terms of the average residual life, or the point at which approximately 50% of measures would have been retired due to failure. Failure can mean physical failure, but also includes early removals due to remodeling and renovation. After this number of years has elapsed, participants are dropped from the cumulative total of participants for which energy savings are calculated. This simplifying procedure is followed rather than the more complex procedure of declining the participant cohort count over the maximum technical measure life.

Kilowatt-hour (kWh) Savings: Seattle City Light sets goals and measures conservation energy savings in annual kilowatt-hours. The utility does not track demand impacts (kilowatts). As a hydroelectric utility able to shift daily loads within its own resources (and both summer and winter peaks), the utility is most interested in the averaged impact of conservation acquisitions on avoided production and power purchases.

Gross Energy Savings: An estimate of change in electricity use from before to after participants take program-related actions. Gross savings do not distinguish naturally occurring conservation from effects attributable solely to the program.

Net Energy Savings: An estimate of electricity savings attributable solely to implementation of the program; that is, *Gross Energy Savings* from participants minus the energy savings that would have occurred even if the program had not been offered. Nonprogram savings are determined from baseline data or a comparison group of nonparticipants, to control for the effects of naturally occurring conservation, changes in behavior and equipment holdings, economic factors, and free-ridership. Typically, evaluations at Seattle City Light have not incorporated spillover effects into estimates of *Net Energy Savings*.

First Year Energy Savings: The net electricity savings acquired in the first year after program participation from projects completed in that year. Savings are counted in the calendar year when measure installation is completed, to facilitate alignment of savings with expenditures and external funding.

Cumulative Energy Savings: The electricity savings from the current year participants (*First Year Energy Savings*), PLUS savings in that year from all prior participants, for program measures with an unexpired lifetime; that is, energy savings in a given year from cumulative participants.

Annual Megawatt-hour (MWh) Savings: The *Cumulative Energy Savings* in a given calendar year, expressed in megawatt-hours (thousands of kilowatt-hours) or gigawatt-hours (millions).

Average Megawatt (aMW) Load Reduction: The total annual load reduction, calculated as *Annual MWh Savings* divided by 8,760 hours per year. Thus savings are reflected as an overall trimming of energy production in every hour of the year, and are not assigned to peak or other costing periods.

Transmission and Distribution Credit: The City Light protocol is to incorporate into aMW statements a 5.2% system average credit for avoided transmission and distribution (T&D) line losses (from generation or wholesale power sources), but never to apply the credit to statements of MWh or kWh impacts.

Savings Since Start of Program: The sum of *Cumulative Energy Savings* estimates across ALL the years from program inception through the current reporting year. This construct exceeds the actual energy savings experienced in any given calendar year; it illustrates the relative investments made by City Light in various resource options.

Summary of Residential Programs

While 14 programs are listed in Table 1, six were still in operation during 2002, and one of these (the Energy Efficiency Water Heater Rebate Program) was discontinued at mid-year. The largest of the active programs are Multifamily Conservation and Built Smart. Other active programs at year-end include the Low-Income Electric, Neighborhood Power, and Retail-Wise Lighting and Appliance Programs.

Total electricity savings achieved by individual residential programs over the entire 1977-2002 period are depicted in the left column of Figure 1. These savings are expressed as gigawatt-hours (GWh, a million kilowatt-hours). While Blanket Seattle (a completed program) had provided the greatest savings through 1993, the tank wraps offered through Blanket Seattle had a shorter lifetime than the measures installed through the weatherization programs, and tank wrap savings are now declining. Savings from the Water Heater Rebate programs continue to provide significant benefits, as does the Home Water Savers Program. However, over the long run the Low-Income Electric, Home Energy Loan, and Multifamily weatherization programs will provide City Light's most enduring residential conservation resource. The Home Energy Check Program is the only audit information and advice program to generate significant savings.

The average load reduction effected by programs with active measures in 2002 is shown graphically in the right column of Figure 1 (average megawatts saved on-site, unadjusted for savings on electric transmission and distribution). At the present time, the greatest energy savings are being derived from past participants in the now-closed Home Water Savers Program, and from the major weatherization programs. Home Water Savers Program savings will have a relatively short lifetime because this was an early adopter program. Changes in the national and state plumbing codes will erode these savings as remodeling and renovation take place in the homes reached by this program. Weatherization savings have a much longer lifetime, usually around 30 years.

Seattle City Light's residential programs acquired 26,597 MWh in new energy savings from projects completed in 2002, at an overall levelized incentive cost of 1.6¢ per kilowatt-hour (kWh) over the lifetime of conservation measures. Measures installed just in non-low income residences acquired savings at an incentive cost of 1.0¢ per kWh.

Table 1

RESIDENTIAL CONSERVATION PROGRAM SUMMARY (1)

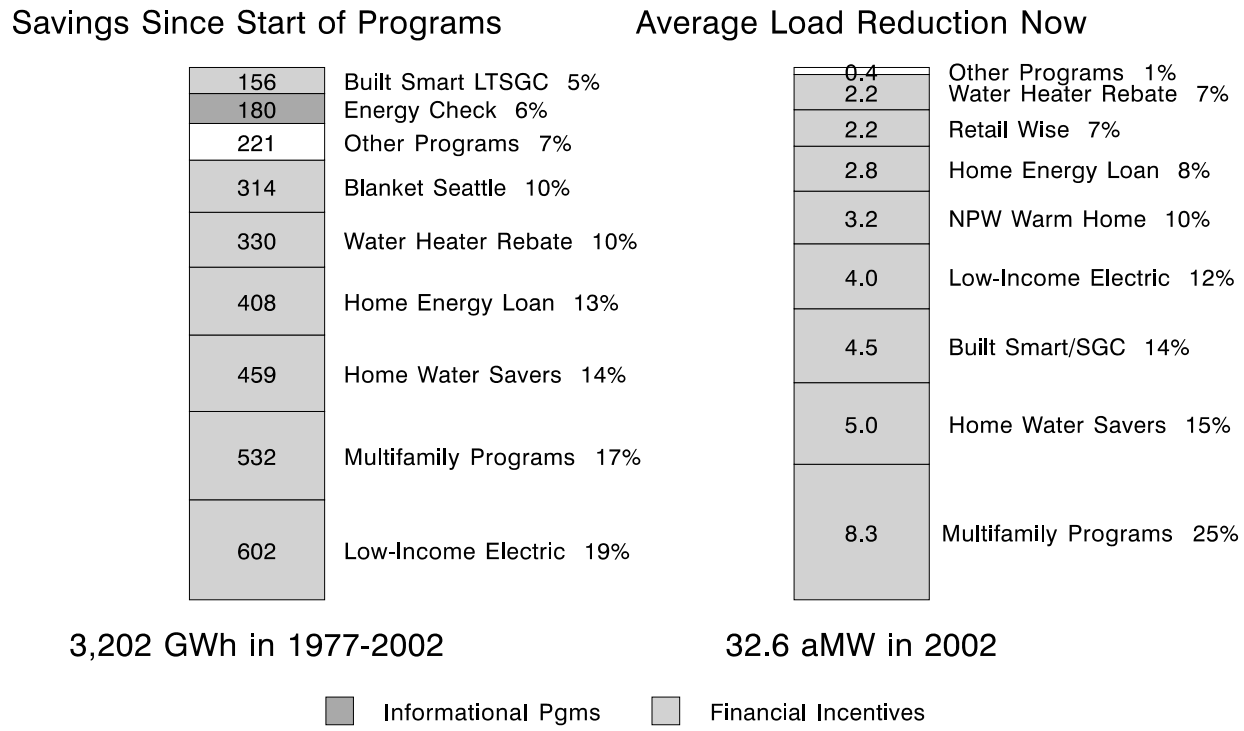
Residential Conservation Programs	***Year Pgm Started***	***Year Pgm Ended***	***First Year MWh Electricity Savings in 2002***	***Lifetime of Program Measures in Years***	***Cumulative Number of Participants***	***Cumulative MWh Electricity Savings thru 2002***	***Average Megawatt Load Reduction in 2002***
Active Programs:							
En Eff Water Htr Rebate Pgm	1992	2002	452	12	49,608	81,977	1.317
Built Smart / Super Good Cents	1992		8,003	33	534	155,896	4.543
Low-Income Electric Pgm	1981		94	30	11,362	601,710	3.984
Multifamily Conservation Pgms	1986		6,892	21	2,951	532,237	8.317
Neighborhood Power Pgms	1994	(1997)	600	7	7,024	86,480	3.225
Retail-Wise Light and Appliance	1992		10,556	8	21,726	46,855	2.243
Inactive Programs:							
Blanket Seattle / Water Heat Insulation and Setback Pgm	1977	1983	0	10	113,513	313,652	0.000
Home Energy Check Pgm	1981	1992	0	10	35,238	180,357	0.025
Home Energy Loan Pgm	1981	1993	0	30	12,286	408,397	2.760
Home Water Savers Pgm	1992	1995	0	15	84,535	459,237	4.984
Neighborhood Workshops	1978	1982	0	10	2,354	11,532	0.000
Residential Efficiency Stds	1981	1996	0	30	1,340	54,006	0.321
Residential Insulation Pgm	1978	1980	0	30	494	21,928	0.107
Water Heater Rebate Pgm	1983	1990	0	16	40,076	247,800	0.843
Residential Total			**26,597**		**603,967**	**3,202,064**	**32.645**

Notes

1. Data for this table were aggregated from individual program entries in Sections II and IV of this report. For the residential weatherization programs, buildings are counted as participants rather than dwelling units affected. In 1997 the Warm Home Program ended as a stand-alone, and continuing home weatherization activity was absorbed into the Neighborhood Power Program. Neighborhood Power participant counts in 2001 exclude 178,281 customers receiving Conservation Kits and installing compact fluorescent light bulbs.

Figure 1

RESIDENTIAL ENERGY SAVINGS



Notes

1. The first column illustrates the proportion of savings achieved over the 26 years since the start of all programs (the sum of annual savings from cumulative participants, or Savings Since Start of Program). It provides a sense of how each program, active or discontinued, has contributed to the overall energy conservation resources acquired by Seattle City Light. The second column depicts the proportion of 2002 average load reduction achieved by each program having measures still active in 2002 (calculated from the *Cumulative Energy Savings*).

Summary of Commercial–Industrial Programs

A summary of Commercial and Industrial (C–I) conservation programs is provided in Table 2. There are 16 program entries representing informational programs, financial incentive programs and regulations. Of the six programs operating in 2002, the largest was the Energy Smart Design Program. Projects originally contracted in this program will continue to be reported under it until all have reached completion. However, 2001 was the last year in which new participants were enrolled to participate in the Energy Smart Design Program and Energy $avings Plan (now closed). Beginning January 2002, all energy management services to medium and large commercial and industrial customers were initiated under the new Energy Smart Services Program.

Energy savings have not been estimated for the Lighting Design Lab, for the new Sustainability Programs, or for commercial buildings affected by the Energy Code Program. Among discontinued C–I programs still generating energy savings, the largest were the Energy Management Survey, Street and Area Lighting, and Commercial Incentives Pilot Programs.

The electricity savings achieved from individual commercial and industrial conservation programs over the entire 1977-2002 period are shown in the left column of Figure 2. These savings are expressed as gigawatt-hours (GWh, a million kilowatt-hours). Because most of City Light's C–I conservation programs were primarily informational until 1986, one-fifth of the C–I savings in Figure 2 are from audit information and advice programs.

The average load reduction effected by programs with active measures in 2002 is shown graphically in the right column of Figure 2 (average megawatts saved on-site, unadjusted for savings on electric transmission and distribution). Currently the greatest energy savings are being acquired from the Energy Smart Design Program, which is graphed in combination with Energy Smart Services, in this Figure.

Seattle City Light's commercial and industrial programs acquired 47,306 MWh in new energy savings from projects completed in 2002, at an overall levelized incentive cost of 1.1¢ per kilowatt-hour (kWh) over the lifetime of conservation measures.

Table 2

COMMERCIAL–INDUSTRIAL CONSERVATION PROGRAM SUMMARY (1)

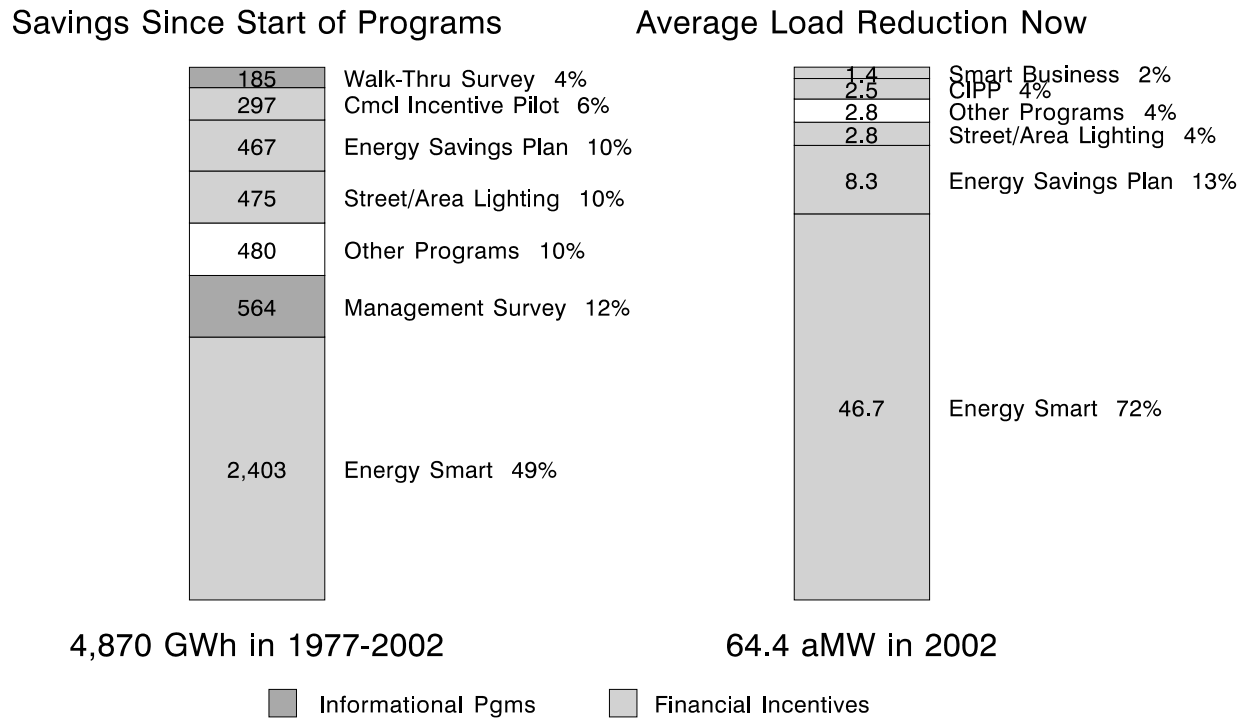
Commercial – Industrial Conservation Programs	***Year Pgm Started***	***Year Pgm Ended***	***First Year MWh Electricity Savings in 2002***	***Lifetime of Program Measures in Years***	***Cumulative Number of Participants***	***Cumulative MWh Electricity Savings thru 2002***	***Average Megawatt Load Reduction in 2002***
Active Programs:							
Energy $avings Plan	1988		6,824	16	475	467,033	8.281
Energy Smart Design Pgm	1989		23,364	15	2,340	2,385,885	44.834
Energy Smart Services Pgm	2001		15,409	15	2,868	16,689	1.832
Lighting Design Lab	1988		—	16	4,667	0	0.000
Smart Business Rebate Pgm	1995		1,709	11	1,084	47,532	1.392
Sustainability & Energy Code	1989		—	15	1,727	20,028	0.268
Inactive Programs:							
BPA Comrcl Tank Wrap Pgm	1982	1983	0	12	997	5,988	0.000
Cmrcl Incentives Pilot Pgm	1986	1991	0	16	234	296,708	2.460
En Code Major Projects Reqmt	1984	1991	0	16	46	123,544	0.720
Energy Mgmt Partnership Pgm	1980	1983	0	16	32	110,447	0.000
Energy Mgmt Survey Pgm	1984	1992	0	16	938	564,032	1.106
General Service Efficiency Stds	1983	1996	0	18	762	43,188	0.329
Industrial R & D Project	1988	1992	0	15	15	40,142	0.365
Lighting Incentive Pgms	1981	1983	0	5	358	61,057	0.000
Lighting Survey Pgm	1979	1983	0	5	111	28,210	0.000
Street and Area Lighting Pgm	1982	1992	0	16	—	474,711	2.804
Walk-Through Survey Pgm	1980	1983	0	16	449	185,168	0.000
Commercial – Industrial Total			**47,306**		**17,103**	**4,870,362**	**64.391**

Notes

1. Data for this table were aggregated from individual program entries in Sections III and V of this report. For the new construction and retrofit programs, buildings are counted as participants rather than square footage affected.

Figure 2

COMMERCIAL–INDUSTRIAL ENERGY SAVINGS



Notes

1. The first column illustrates the proportion of savings achieved over the 26 years since the start of all programs (the sum of annual savings from cumulative participants, or Savings Since Start of Program). It provides a sense of how each program, active or discontinued, has contributed to the overall energy conservation resources acquired by Seattle City Light. The second column depicts the proportion of 2002 average load reduction achieved by each program having measures still active in 2002 (calculated from the *Cumulative Energy Savings*). 'Energy Smart' combines the impacts of the Energy Smart Design Program and Energy Smart Services for commercial projects.

Conservation Program Participation by Year

As might be expected, participation in City Light's conservation programs and regulations (see Table 3) started slowly in 1977 and built up over time. In Figure 3, the peak of participation in 1982 shows the dramatic impact of the Blanket Seattle Program that installed over 107,000 free water-heater wraps in 1981-1983. Participation in Commercial–Industrial (C–I) programs also rose in 1983 while the commercial water heater wrap program was operating. Another peak in residential participation came in 1992, when 92,000 households in 81,000 buildings installed efficient-flow showerheads from the Home Water Savers Program. In 2001, Seattle City Light reached into more homes than ever when 218,281 households installed one or more compact fluorescent light bulbs received from the Conservation Kit Program and supplemental distributions. Not shown in Table 3 or Figure 3 are the households that purchased 166,418 compact fluorescent light bulbs by year-end 2001 due to prior participation in the Conservation Kit Program.

As of year end 2002, City Light has provided about 621,070 'service units.' A service unit may be conservation measures provided to a single-family home, multiplex or multifamily building, or a commercial–industrial building. Since City Light's 2002 customer base is about 327,100, it is apparent that some have participated in more than one program, or multiple times in the same program. As may be seen, City Light has made significant progress on the Energy Management Services goal to "bring energy efficiency into every home and business in Seattle."

Table 3

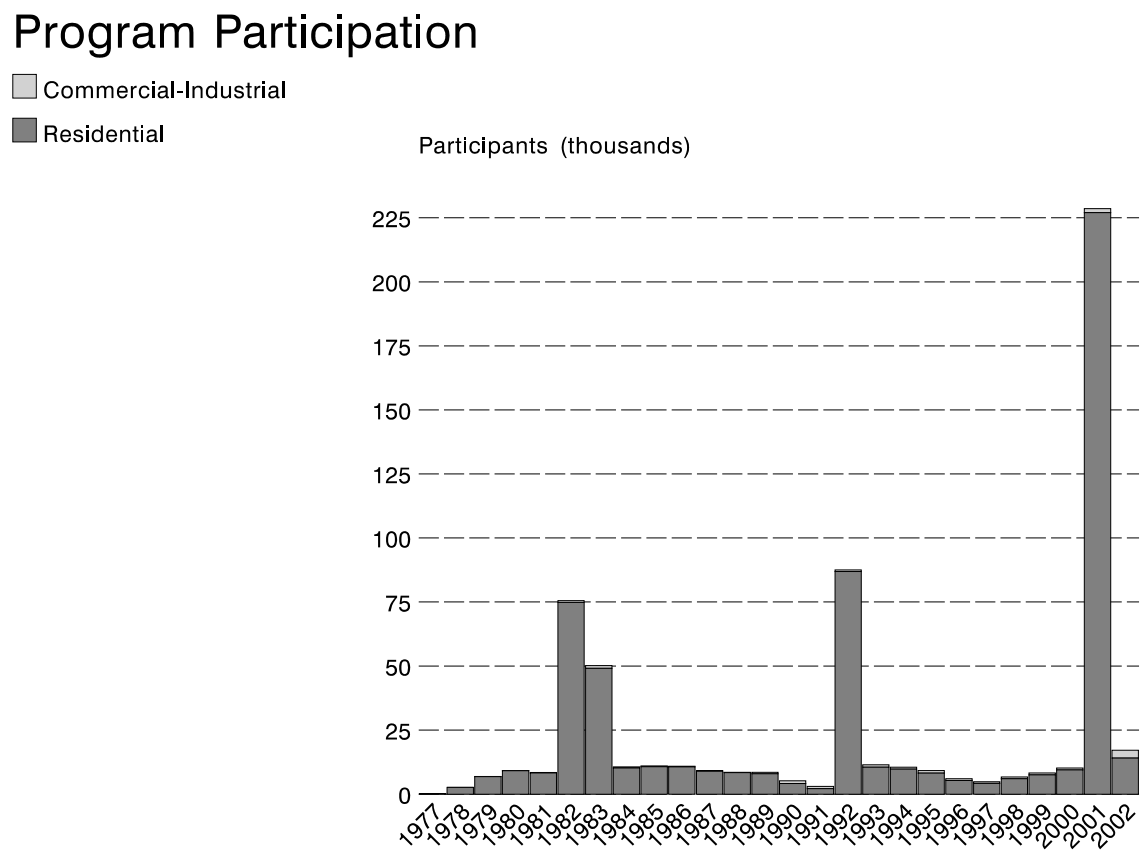
PROGRAM PARTICIPATION BY YEAR (1)

Year	*Residential Program Participants*	*Commercial–Industrial Program Participants*	*Total Program Participants*
1977	232	0	232
1978	2,703	0	2,703
1979	6,840	51	6,891
1980	9,189	48	9,237
1981	8,290	177	8,467
1982	74,871	685	75,556
1983	49,166	1,045	50,211
1984	10,237	442	10,679
1985	10,691	345	11,036
1986	10,666	251	10,917
1987	8,968	193	9,161
1988	8,381	137	8,518
1989	8,021	530	8,551
1990	4,189	1,059	5,248
1991	2,187	811	2,998
1992	86,928	619	87,547
1993	10,543	935	11,478
1994	9,820	733	10,553
1995	8,248	981	9,229
1996	5,354	733	6,087
1997	4,198	657	4,855
1998	6,079	653	6,732
1999	7,549	726	8,275
2000	9,461	746	10,207
2001	227,054	1,466	228,520
2002	14,102	3,080	17,182
Total	**603,967**	**17,103**	**621,070**

Notes

1. Participation figures are aggregated from individual conservation program entries in Sections II-V of this report. Both program participation and compliance with efficiency regulations are included here. The Street and Area Lighting Program is excluded.

Figure 3



Notes

1. Participation figures are aggregated from individual conservation program entries in Sections II-V of this report. Both program participation and compliance with efficiency regulations are included here. The Street and Area Lighting Program is excluded.

Conservation Energy Savings by Year

Table 4 describes incremental first year energy savings acquired from the cohort of participants in each program year. Projects completed in 2002 generated about 74,000 megawatt-hours (MWh). Of these 2002 first year savings, 64% were acquired from Commercial and Industrial projects. By contrast, 42% of first year savings in 1992 and 75% in 2000 were acquired from the Commercial and Industrial sectors.

Figure 4 illustrates the acquisition of first year savings by sector for each annual cohort of new program participants. Annual acquisition from residential programs hit peaks in 1982-1983 with Blanket Seattle (a water-heater wrap program), in 1992 with Home Water Savers (showerheads), in 2001 with Conservation Kits (compact fluorescent bulbs), and with 'spillover' CF light purchasing in 2002. Annual acquisition from commercial-industrial programs rose in 1993-1996 with the ramp-up and down of BPA funding. City Light rallied in 1998-1999 with utility funds, retrenched in 2000 during the West Coast energy price crisis, and rallied again in 2001 with the highly successful '10+10' Incentive Bonus for medium and large customers.

Savings in subsequent years from each cohort would typically be lower than the amount shown in Table 4 (due to removals from service, increased conservation activity among nonparticipants, and other factors that degrade net effects). In fact, the sum of first year savings across years would be equivalent to 120 average-megawatts (aMW) if all measures were still installed and performing at first year levels; the actual load reduction in 2002 was 85% of this amount.

Table 4

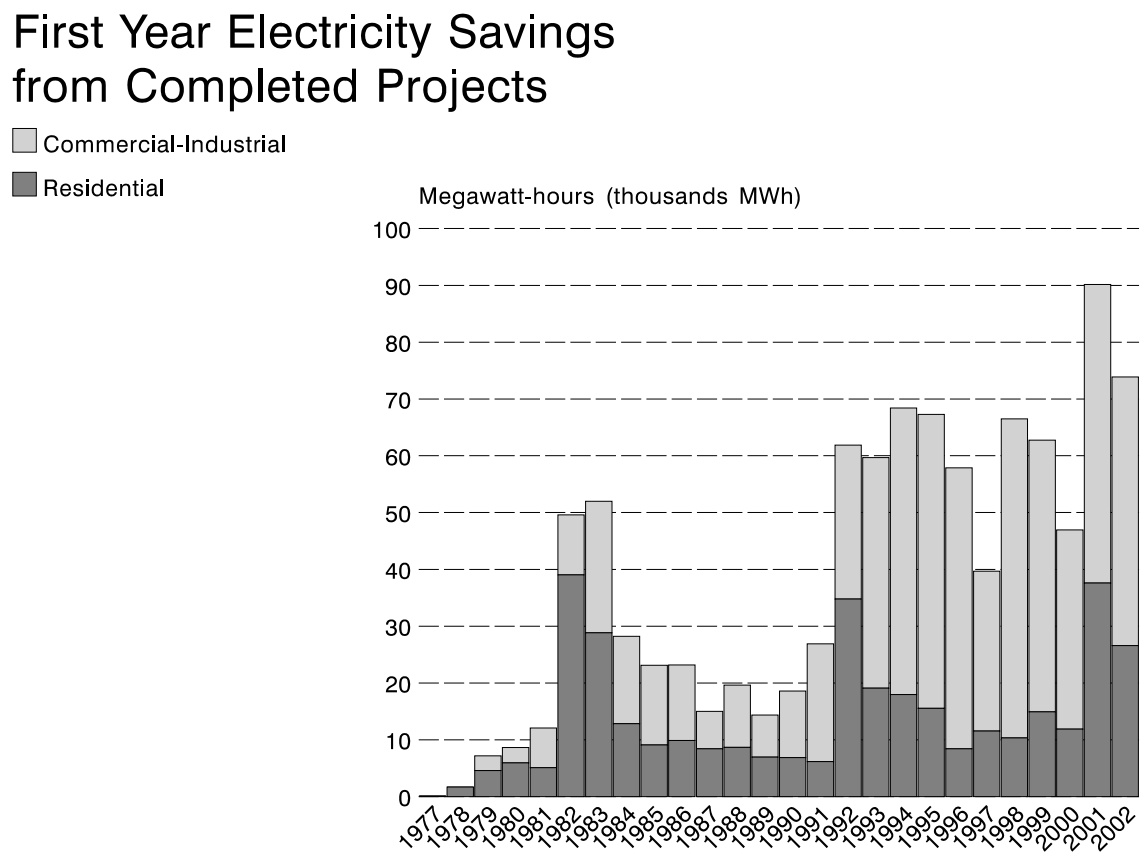
FIRST YEAR ELECTRICITY SAVINGS BY PARTICIPATION YEAR
— from Completed Projects — (1)

Year	*Residential Programs (MWh)*	*Commercial Programs (MWh)*	*Industrial– Government Programs (MWh)*	*Total First Year Savings (MWh)*
1977	116	0	0	116
1978	1,680	0	0	1,680
1979	4,591	2,592	0	7,183
1980	5,940	2,701	0	8,641
1981	5,103	6,973	0	12,076
1982	39,022	8,784	1,783	49,589
1983	28,855	15,820	7,338	52,013
1984	12,843	12,869	2,506	28,218
1985	9,092	9,340	4,691	23,123
1986	9,886	8,150	5,148	23,184
1987	8,425	4,469	2,122	15,016
1988	8,272	10,020	955	19,647
1989	6,955	4,030	3,387	14,372
1990	6,864	8,953	2,779	18,596
1991	6,168	20,057	686	26,911
1992	34,782	21,986	5,113	61,881
1993	19,099	35,503	5,071	59,673
1994	17,987	46,592	3,840	68,419
1995	15,549	37,037	14,718	67,304
1996	8,419	39,721	9,732	57,872
1997	11,531	23,569	4,575	39,675
1998	10,316	53,567	2,617	66,500
1999	14,924	34,364	13,470	62,758
2000	11,894	33,275	1,779	46,948
2001	37,596	49,600	2,954	90,150
2001	26,597	40,482	6,824	73,903
Total	**362,906**	**530,454**	**102,088**	**995,448**

Notes

1. Savings are aggregated from individual conservation program entries in Sections II-V of this report. The Energy Code Program (commercial buildings) and Lighting Design Lab are excluded.

Figure 4



Notes

1. Savings are aggregated from individual conservation program entries in Sections II-V of this report. The Energy Code Program (commercial buildings) and Lighting Design Lab are excluded.

A summary of electricity savings by sector from conservation efforts is provided in Table 5. This table (displayed graphically in Figure 5) shows that there has been a dramatic increase in electricity savings from 1977 through 2002. In 1978 City Light conservation programs saved approximately 1,800 MWh; by 2002, the combined residential, commercial and industrial programs saved over 850,000 MWh. These savings come from two sources: (1) savings from earlier program participants that continue over the lifetime of the conservation measures installed, and (2) first year savings from new participants that are added each year.

The electricity savings described in this document are primarily based on programs with measured electricity savings derived from evaluation studies. Because measured evaluation savings generally involve comparison with 'control groups' of nonparticipants, short-term price effects are factored out. Long-term price effects are not considered here.

From 1977 through 2002, conservation programs saved nearly 8.1 million megawatt-hours (MWh). These savings acquired since the start of all programs would be enough to provide electricity to about 782,000 homes for one year (more than twice the number that exist in our whole service area). Energy savings acquired in 2002 from cumulative participants with active measures totaled 850,036 MWh, enough to power 82,300 homes (about one-fourth of our residential service area).

Electric space heat and water heat are prevalent in Seattle's marine climate, making City Light a winter-peaking utility. Air conditioning during the summer is rare in homes, although it is common in commercial buildings all year round. Greater electricity use during the winter has governed the evolution of conservation programs in Seattle. Nonetheless, Seattle City Light focuses on average overall load reduction as its basic energy management strategy, from year-round lighting and water heat end uses as well as from winter heating and summer cooling.

The average utility system load reduction in 2002 was 97.0 average megawatts (aMW). By sector, this unadjusted on-site load reduction was: Residential, 32.6 aMW; Commercial, 52.9 aMW; and Industrial–Governmental, 11.5 aMW.

Figure 6 describes the average megawatts of load reduction achieved in each year from 1977 through 2002. These reductions in average load (from Tables 1 and 2) are adjusted upward by 5.2% to reflect savings in energy transmission and distribution (energy that would have been lost on lines from alternative hydroelectric resources). With this adjustment, the average load reduction in 2002 reached 102.1 aMW. In 1991 the load reduction acquired by commercial and industrial programs overtook residential program production.

Table 5

PROGRAM ELECTRICITY SAVINGS IN EACH YEAR
— from Completed Projects — (1)

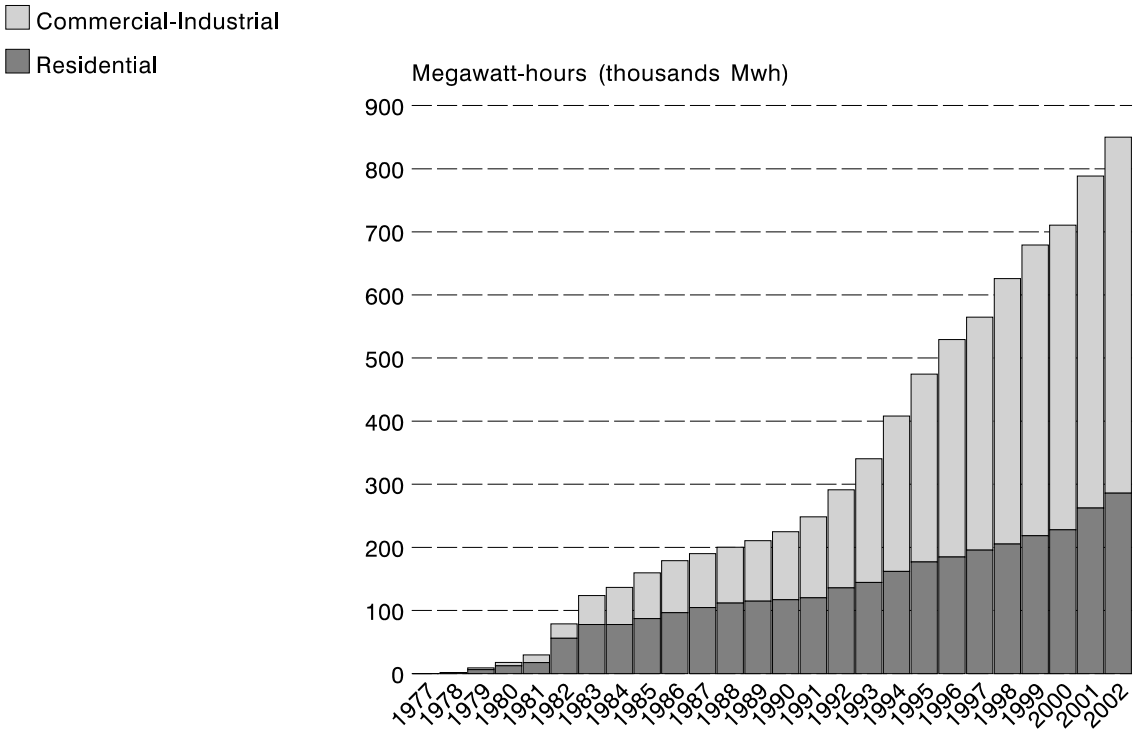
Year	*Residential Programs (MWh)*	*Commercial Programs (MWh)*	*Industrial–Government Pgms(MWh)*	*Total Savings (MWh)*
1977	116	0	0	116
1978	1,796	0	0	1,796
1979	6,386	2,592	0	8,978
1980	12,325	5,293	0	17,618
1981	17,428	12,265	0	29,693
1982	56,073	21,050	1,783	78,906
1983	77,729	36,869	9,121	123,719
1984	77,878	47,145	11,627	136,650
1985	87,210	56,128	16,317	159,655
1986	96,412	61,003	21,465	178,880
1987	104,781	61,618	23,587	189,986
1988	111,821	63,864	24,542	200,227
1989	114,873	67,893	27,929	210,695
1990	117,197	76,847	30,708	224,752
1991	120,164	96,903	31,393	248,460
1992	135,876	118,888	36,506	291,270
1993	144,548	154,350	41,577	340,475
1994	162,077	200,648	45,417	408,142
1995	176,957	237,331	60,136	474,424
1996	184,791	274,706	69,868	529,365
1997	195,637	294,580	74,443	564,660
1998	205,437	343,428	77,060	625,925
1999	218,559	370,076	90,530	679,165
2000	227,776	390,516	92,309	710,601
2001	262,244	430,725	95,263	788,232
2002	285,973	463,759	100,304	850,036
Total	**3,202,064**	**3,888,476**	**981,886**	**8,072,426**

Notes

1. Savings are aggregated from individual conservation program entries in Sections II-V of this report. The NW Energy Code Program (commercial buildings) and Lighting Design Lab are excluded.

Figure 5

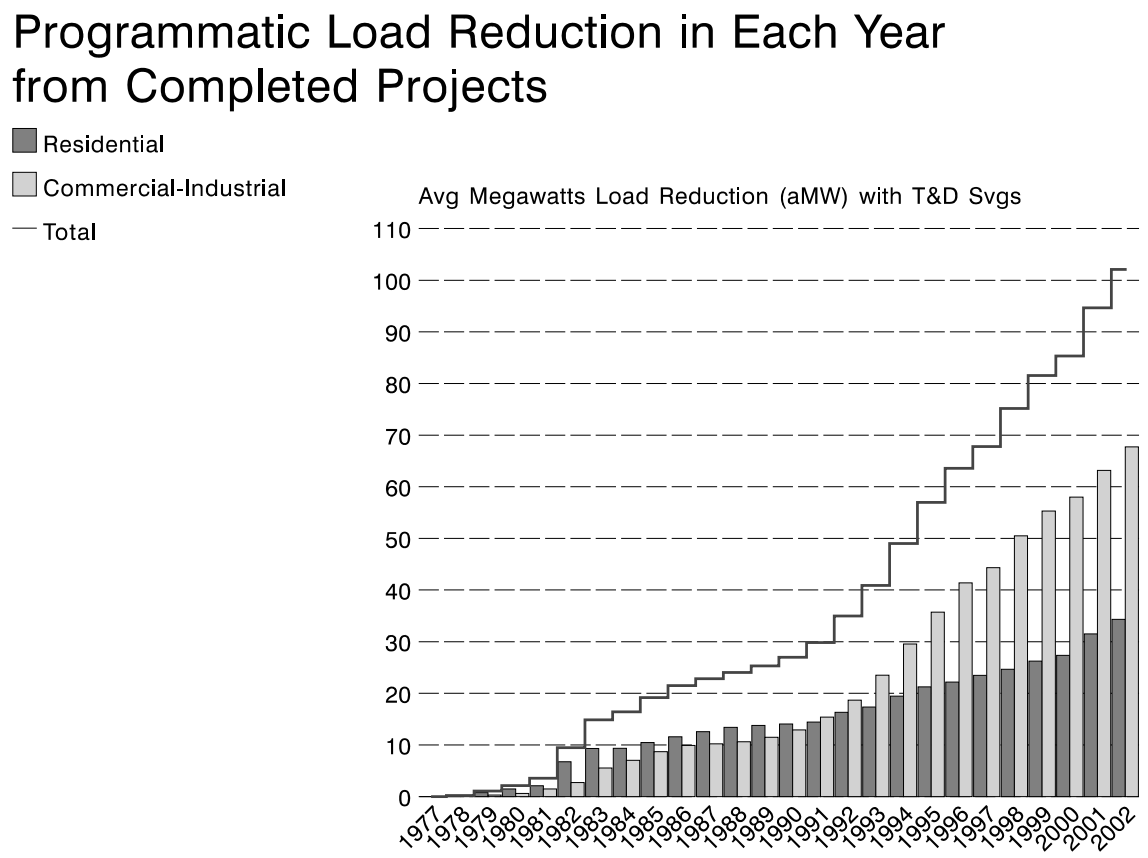
Program Electricity Savings in Each Year from Completed Projects



Notes

1. Savings are aggregated from individual conservation program entries in Sections II-V of this report. The NW Energy Code Program (commercial buildings) and Lighting Design Lab are excluded.

Figure 6



Notes

1. Load reduction in average megawatts is adjusted upward by 5.2% to reflect savings in energy transmission and distribution.

Community Benefits and Customer Bill Savings by Year

There are many ways of looking at the benefits of conservation. From City Light's perspective, the primary benefits from conservation programs are the energy savings and load reduction that displace alternative, more costly resources. From a customer's perspective, however, bill savings (and perhaps increased comfort) are the major attraction of conservation programs. Table 6 and Figure 7 show that City Light's customers have experienced enormous bill savings as a result of their participation in conservation programs. From the community perspective, reduced energy usage reaps significant benefits for the atmosphere.

Customer Bill Savings: In 'nominal' dollars—those of each year as they occur—customer bill savings from 1977 through 2002 totaled about $310 million (see Table 6 and the bars of Figure 7). If this amount were adjusted using the Consumer Price Index for urban and clerical workers, then the savings would be about $370 million in 2002 dollars (the labeled line in Figure 7). Over the entire 26-year period, 50% of these bill savings went to customers in the residential sector. In recent years, commercial customer bill savings have been increasing.

In 2002 the average annual electric rates by customer sector were, in cents per kilowatt-hour: Residential, 6.90¢ (weighted by seasonal end blocks and rate assistance categories); Commercial, 6.20¢; Industrial, 5.28¢; and Governmental, 6.04¢. At the same time, the national average cost of electricity for residential customers was 8.43¢ per kWh.

Community Benefits: Another perspective on the benefits of conservation is Seattle City Light's role in reducing greenhouse gas emissions. Beginning with programs active in 1988, Seattle has been tracking indirect reductions of carbon dioxide emissions for voluntary reporting in the federal Climate Challenge Report. From conservation and generation system efficiency measures installed during 1991-2002, Seattle City Light achieved reductions of about 340,500 tons of atmospheric carbon dioxide in 2002. About 88% of this amount is attributable to the Utility's energy conservation programs.

These calculations assume that an efficient natural gas-fired combined cycle combustion turbine would have been utilized in the absence of these conservation savings. The rate is computed as 0.4324 short tons per megawatt-hour saved, equivalent to 3,787.8 tons of carbon dioxide emissions avoided per average megawatt of load reduction.

The conservation savings on carbon dioxide emissions in each year have been: 5,663 tons (1991); 30,885 tons (1992); 56,169 tons (1993); 85,212 tons (1994); 113,995 tons (1995); 138,860 tons (1996); 156,014 tons (1997); 184,769 tons (1998); 211,905 tons (1999); 232,206 tons (2000); 271,171 tons (2001); and 302,216 tons in the most recent year (2002). Another way of stating these conservation savings is in terms of the number of vehicles that emit an equivalent amount of carbon dioxide. The greenhouse gas impact of Seattle City Light's

conservation programs could only otherwise have been achieved by removing 29,800 vehicles from the roads at the end of 1990 and keeping them off during each year 1991 through 2002.

By year, the number of vehicles that emit CO_2 gas into the atmosphere equivalent to reductions achieved by City Light conservation would be: 1,133 vehicles (1991); 6,177 vehicles (1992); 11,233 vehicles (1993); 17,042 vehicles (1994); 22,799 vehicles (1995); 27,772 vehicles (1996); 31,203 vehicles (1997); 36,954 vehicles (1998); 42,381 vehicles (1999); 46,441 vehicles (2000); 54,234 vehicles (2001); and 60,443 vehicles in the most recent year (2002). The atmospheric gas impact in 2002 was equivalent to one out of five households in the utility's service area garaging a vehicle for the year.

Table 6

CUSTOMER BILL SAVINGS BY YEAR
in Nominal Dollars (1)

Year	*Residential Programs*	*Commercial Programs*	*Industrial Programs*	*Total Bill Savings*
1977	$1,535	$0	$0	$1,535
1978	23,763	0	0	23,763
1979	84,493	18,486	0	102,979
1980	191,701	48,506	0	240,207
1981	341,807	145,954	0	487,761
1982	1,306,485	285,530	0	1,592,015
1983	2,281,060	577,035	0	2,858,095
1984	2,495,199	899,697	50,984	3,445,881
1985	2,994,144	1,207,967	70,410	4,272,521
1986	3,511,570	1,452,159	96,718	5,060,446
1987	3,970,194	1,495,318	111,306	5,576,819
1988	4,251,870	1,516,480	111,787	5,880,137
1989	4,350,592	1,713,367	172,769	6,236,729
1990	4,307,552	1,959,767	230,806	6,498,125
1991	4,440,214	2,505,826	243,427	7,189,467
1992	5,173,369	3,184,771	388,139	8,746,279
1993	6,066,433	4,563,210	577,008	11,206,651
1994	7,258,064	6,187,540	727,708	14,173,312
1995	8,175,925	7,395,681	1,215,676	16,787,281
1996	8,705,365	8,550,221	1,491,028	18,746,614
1997	9,453,252	9,718,338	1,796,027	20,967,617
1998	9,709,335	11,207,491	1,851,534	22,768,360
1999	10,375,890	11,946,226	2,252,007	24,574,124
2000	12,111,377	13,176,147	2,283,101	27,570,624
2001	17,708,047	20,145,774	3,264,300	41,118,121
2002	24,456,412	24,775,428	4,207,918	53,439,759
Total	**$153,745,646**	**$134,676,920**	**$21,142,654**	**$309,565,220**

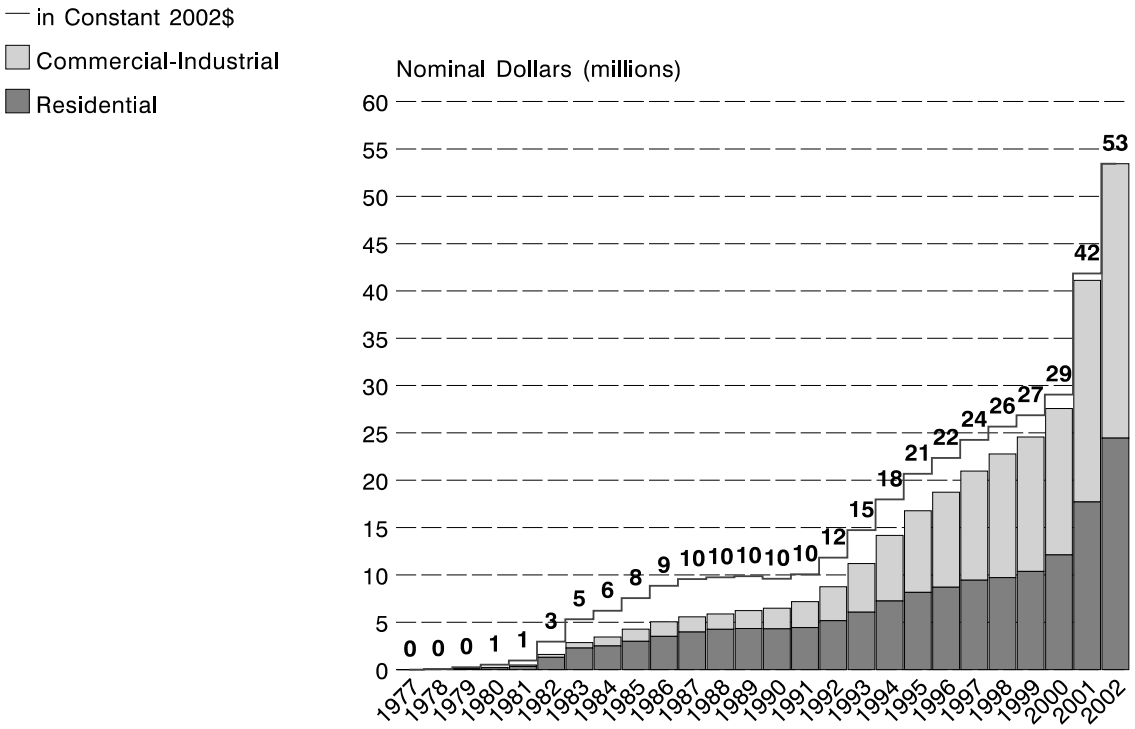
Notes

1. Customer bill savings are calculated for each class of customer, excluding the Street and Area Lighting Program, which provides governmental energy savings. Computation of bill savings is based on energy savings from cumulative participants and the average summer and winter rates in effect during each calendar year (or the higher usage 'winter end block' only, in the case of residential weatherization program customers).

   The 2002 average rate per kWh for each class of customers was: Residential Standard (RSC end-block), 10.86¢; Residential Elderly/Disabled and Low-Income (REC/RLC end-block), 4.60¢; Small General Service (SMC–commercial), 5.93¢; Medium General Service (MDC City–standard), 5.74¢; Medium General Service (MDS suburban–industrial), 5.85¢; Large and High-Demand General Service (LGC–industrial), 5.30¢.

Figure 7

Customer Bill Savings in Each Year from Completed Projects



Notes

1. Customer bill savings are calculated for each class of customer, excluding the Street and Area Lighting Program, which provides governmental energy savings. Computation of bill savings is based on energy savings from cumulative participants and the average summer and winter rates in effect during each calendar year (or the higher usage 'winter end block' only, in the case of residential weatherization program customers).

Conservation Staffing and Budgets by Year

The Energy Management Services Division of Seattle City Light is organized to carry out Seattle's commitment to the conservation energy resource. Staffing levels peaked in 1982 and 1983 during a period of expected energy resource deficits, when substantial Bonneville Power Administration funding was available for conservation. The annual summary of budgeted staff positions and total division budgets (nominal dollars) are shown in Table 7 and Figure 8.

In 2002 the division employed 69.0 full-time equivalent staff. Most employees are organized into functional teams within sector-based groups: Community Conservation and Commercial–Industrial Conservation. The teams deliver informational, in-the-field, incentive, contracting and financial services; they also supply program coordination, implementation planning, and program administration for residential, commercial, industrial, and governmental–institutional customers. Another group provides division-wide Support Services including policy direction, marketing, general administrative support, and program evaluation.

The total division budget includes not only Direct Program costs but also these related Support Service costs. In 2002 the total division budget was just under $24.3 million. This corresponds to 4.3% of total Seattle City Light customer revenues in 2002 (down from 9.5% in 1995). From 1977 through 2002, Seattle City Light has budgeted $422.9 million nominal dollars for the acquisition of the conservation energy resource. Budgets include expenses that are later offset by revenues from outside funding sources and customer loan repayments.

Actual expenditure of budgeted monies does not always take place within the same calendar year. Budgeted obligations are entered into which carry across years. For example, incentive monies may be obligated by contract for efficiency improvements in new construction projects that are built one to four years after initial program entry. Following Figure 8 is a description of actual expenditures by year for program participants with conservation work completed during each calendar year.

Table 7

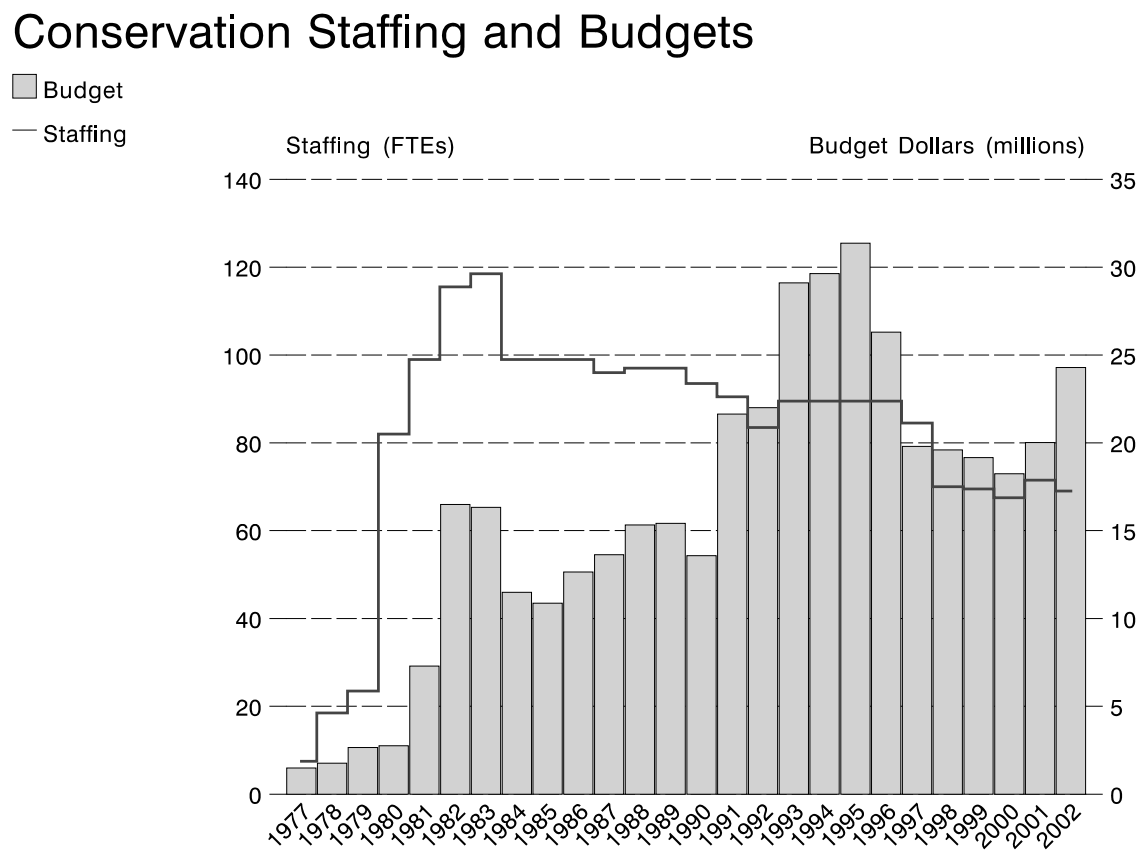
CONSERVATION STAFFING AND BUDGETS BY YEAR

Year	*Budgeted Positions FTEs*	*Total EMSD Budget in Nominal$*	*Total City Light Customer Revenues*	*EMSD Budget as Percent of Sales*
1977	7.5	$1,491,000	$98,599,000	1.5%
1978	18.5	1,760,000	91,148,000	1.9
1979	23.5	2,658,000	96,399,000	2.8
1980	82.0	2,758,000	113,362,000	2.4
1981	99.0	7,295,000	133,836,000	5.5
1982	115.5	16,495,000	148,410,000	11.1
1983	118.5	16,329,000	164,610,000	9.9
1984	99.0	11,495,000	199,373,000	5.8
1985	99.0	10,869,000	227,444,000	4.8
1986	99.0	12,643,000	241,637,000	5.2
1987	96.0	13,633,000	245,459,000	5.6
1988	97.0	15,320,000	263,610,000	5.8
1989	97.0	15,420,000	281,248,000	5.5
1990	93.5	13,578,000	284,463,000	4.8
1991	90.5	21,639,000	280,945,000	7.7
1992	83.5	22,000,000	292,564,000	7.5
1993	89.5	29,106,000	320,359,000	9.1
1994	89.5	29,640,000	332,801,000	8.9
1995	89.5	31,365,000	329,808,000	9.5
1996	89.5	26,300,000	356,671,000	7.4
1997	84.5	19,800,000	362,711,000	5.5
1998	70.0	19,600,000	360,625,000	5.4
1999	69.5	19,157,000	367,935,000	5.2
2000	67.5	18,241,000	391,578,000	4.7
2001	71.5	20,018,000	503,437,000	4.0
2002	69.0	24,289,000	562,432,000	4.3
1977-2002	**—**	**$422,897,000**	**$6,847,622,000**	**6.0%**

Notes

1. Some conservation implementation is also carried out by other City Light divisions (e.g., Customer Engineering) and other City agencies (e.g., Office of Housing; Department of Design, Construction and Land Use). Those staffs are not included in the positions above.

Figure 8


Conservation Staffing and Budgets
Budget
Staffing
Staffing (FTEs)
Budget Dollars (millions)
140
120
100
80
60
40
20
0
35
30
25
20
15
10
5
0
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Conservation Expenditures by Year

Conservation expenditures by year for each program can be found in Sections II-V. The annual summary of Residential and C–I program expenditures is shown in Table 8 and Figure 9. Expenditures to date (including accruals for outstanding work nearing completion) comprise 88% of conservation budgets to date.

Four caveats should be kept in mind when examining these expenditure data.

First: Both Direct Program costs and Support Service costs are presented. Support Service costs include conservation-related expenditures for functions such as support of energy codes and early adopter activities, long range planning, research and development, performance measurement and evaluation, data processing and general conservation administration.

From 1977 through 1992, Support Service costs included general DSM administration but excluded any general corporate overhead charges. Beginning in April 1993, a corporate service overhead charge was initiated for utility Administrative and General (A&G) expenses. This charge distributes non-programmatic, non-conservation labor and expenses to individual conservation programs in proportion to programmatic labor hours. The new A&G service charge affected a portion of Support Service costs that is capitalized.

During the period 1977-1992, Direct Program costs also excluded indirect costs from City Departments, e.g., for facilities and general utility administration. Direct Program costs included labor, expenses, and customer incentives. The total utility cost during these years included program administration, incentives, and Support Service costs but did not include any general corporate overhead charges. Specific overhead charges for employee benefits, vehicles, and equipment have always been included in program-level costs.

The 1993-2002 program administration cost data now include the corporate service overhead charge, begun in April 1993, for utility A&G expenses. In 1993 the new A&G service overhead charge for all active programs was $975,976. This comprised 26% of City Light's programmatic conservation administration expenses in 1993, increasing total administration by about 38% over prior years. In 1994 the A&G service charge was $1,224,735 (31% of program administration expenses); in 1995 it was $1,286,428 (22%). The A&G service charge continued at similar levels in 1996-2002.

Because City Light program costs now include the City Light A&G charge, expenditures for low-income programs (operated by the Department of Housing and Human Services) have been adjusted for the same 1993-2002 period. Indirect expenses formerly excluded from expenditure tables (reported only in footnotes) have been restored to the tables and program summaries. The

former exclusion of DHHS indirect costs, and the current inclusion for 1993-2002, are intended to foster more accurate comparisons of costs across programs.

Program-specific expenses reported in each program entry (see SECTIONS II-V) continue to exclude the costs of most conservation Support Services, which are reported only at the utility level in Section I. However, City Light accounting practices charge some program-specific planning, evaluation, and data processing expenses to the relevant programs for purposes of capitalizing the complete cost of resource acquisition. In all cases, the total expenditures reported here represent the initial cost to the utility and not the total resource cost.

Second: Some of the expenditures in Table 8 (a portion of those for the HELP, Multifamily Conservation Programs, and earlier Residential Insulation Program) were loans to customers that will be—or have already been—paid back to City Light. Information on repayment is included under the category of revenues, in the discussion following Table 9.

Third: Program expenditures reflect work completed but exclude obligations or encumbrances for work contracted and still in progress. As has been noted earlier, budget is often obligated for projects at the stage of contract acquisition, while projects may be completed and put into production in subsequent years.

And Fourth: As is often the case, historical records for early conservation expenditures are probably less reliable than more recent figures, since record-keeping systems have improved over time. Thus historical series should accord greater weight to the accuracy of information on the past decade than on the previous one.

In 2002 the total division expenditures were just over $19.6 million. This corresponds to 3.5% of total City Light customer revenues in 2002 (down from 8.6% in 1995). From 1977 through 2002, City Light has expended over $371 million nominal dollars for the acquisition of the conservation energy resource. Expenditures include costs that are later offset by revenues from outside funding sources and customer loan repayments. Utility expenditures exclude excess costs associated with conservation projects that are borne directly by the customer.

It is clear from Table 8 that for years residential program expenditures were consistently higher than expenditures for C–I conservation efforts. This was due to a later start for C–I efforts and the fact that early C–I programs focused on conservation information and advice rather than financial incentives. The peak in 1983 conservation expenditures echoes the peak in program participation shown earlier in Table 3. This was a 'high point' for conservation activity when several short-term programs were underway (e.g., tank wraps) and City Light was receiving significant funding for conservation activities from the BPA. In 1993 for the first time, C–I expenditures exceeded Residential program expenditures, by over $2 million.

Table 8

CONSERVATION EXPENDITURES BY YEAR

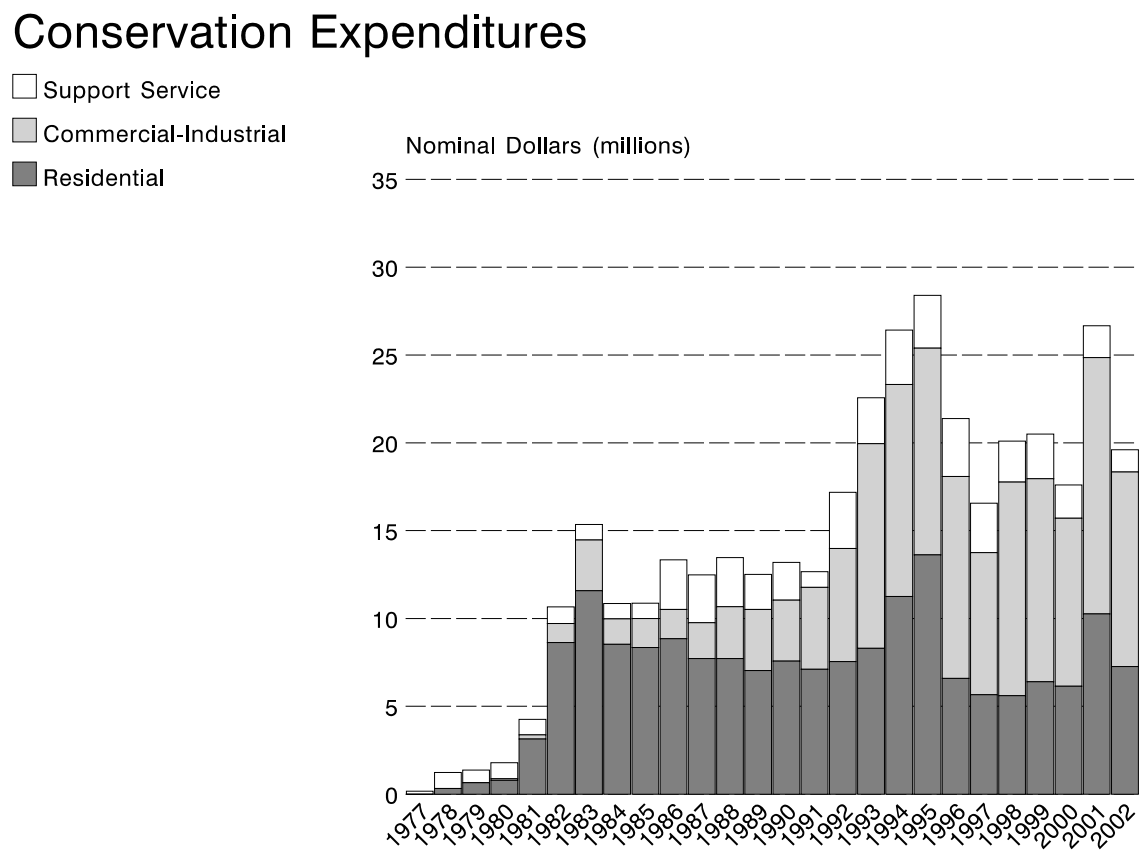
Year	*Residential Programs*	*Commercial Programs*	*Industrial–Government Programs*	*Total* (1) *Program Expenditures*	*Support Services* (2)	*Total Conservation Expenditures*
1977	$0	$0	$0	$0	$168,015	$168,015
1978	329,195	0	0	329,195	903,979	1,233,174
1979	651,947	8,292	0	660,239	710,263	1,370,502
1980	789,202	87,201	0	876,403	911,967	1,788,370
1981	3,136,571	241,968	0	3,378,539	880,232	4,258,771
1982	8,630,058	402,827	682,052	9,714,937	946,225	10,661,162
1983	11,582,744	500,131	2,380,145	14,463,020	885,567	15,348,587
1984	8,532,480	292,676	1,158,046	9,983,202	874,460	10,857,662
1985	8,351,650	318,067	1,329,245	9,998,962	872,185	10,871,147
1986	8,848,212	447,401	1,221,759	10,517,372	2,825,156	13,342,528
1987	7,717,157	1,042,471	995,767	9,755,395	2,727,756	12,483,151
1988	7,716,451	1,960,093	991,366	10,667,910	2,804,379	13,472,289
1989	7,033,981	2,362,291	1,122,319	10,518,591	1,992,417	12,511,008
1990	7,574,461	2,909,756	556,862	11,041,079	2,157,998	13,199,077
1991	7,110,443	4,258,688	401,541	11,770,672	894,674	12,665,346
1992	7,548,393	5,957,779	479,493	13,985,665	3,195,691	17,181,356
1993	8,304,001	10,765,436	886,407	19,955,844	2,610,218	22,566,062
1994	11,252,776	11,160,191	914,277	23,327,244	3,090,435	26,417,679
1995	13,618,771	9,597,147	2,172,550	25,388,468	3,012,332	28,400,800
1996	6,595,868	9,432,413	2,051,652	18,079,933	3,302,634	21,382,567
1997	5,660,930	6,730,987	1,354,792	13,746,709	2,819,454	16,566,163
1998	5,605,327	11,227,480	934,810	17,767,617	2,330,961	20,098,578
1999	6,396,437	9,786,753	1,774,390	17,957,580	2,539,336	20,496,916
2000	6,143,300	8,979,240	581,396	15,703,936	1,903,001	17,606,937
2001	10,259,916	13,816,710	781,131	24,857,757	1,806,864	26,664,621
2002	7,266,463	10,296,837	772,427	18,335,727	1,273,584	19,609,311
Total	**$176,656,734**	**$122,582,835**	**$23,542,427**	**$322,781,997**	**$48,439,783**	**$371,221,779**

Notes

1. Expenditures are aggregated from the conservation program entries in SECTIONS II–V of this report. Program expenditures reflect work completed, from which energy savings are being acquired. Excluded are obligations and encumbrances for work contracted and in progress. For example, commercial construction projects can take up to three years from initial design or audit to project completion and building occupation. Hence these expenditure totals do not equal those from general accounting ledgers. The expenditure figures are also not net of BPA reimbursements, customer loan repayments, or other sources of revenue.

2. Support services include conservation-related expenditures such as support of energy codes and early adopter activities, long-range planning, research and development, evaluation, data processing and general administration. Support service expenditures have averaged $2.4 million since 1987, or about 13% of total expenditures for conservation. There were timing problems in reconciling the general accounting system to evaluation records for 1982-1986.

Figure 9



Notes

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Conservation Funding by Year

Because conservation achievements in Seattle City Light's service territory benefit the entire region, the Bonneville Power Administration reimbursed City Light for a portion of its conservation expenditures in 20 of the past 22 years. Funds from the BPA for conservation programs were first received by City Light late in 1981. These funds were committed to City Light under a short-term contract that lasted until 1983. An inability to negotiate mutually satisfactory terms resulted in the loss of all BPA funding in 1984 and throughout most of 1985.

Beginning in October 1985, conservation funding from the BPA was restored under a long-term contract. However, 1995 saw the end of this decade-long relationship as funding contracts between Seattle City Light and the BPA came to a close. Under a Flexibility Agreement, carryover funds were spent from Fall 1996 through Summer 1999 to complete projects authorized under BPA programs. After this time no further BPA funds were received by Seattle City Light to directly fund individual conservation projects and programs, with one exception: an agreement in 2001-2003 for the reimbursement of administration expenses related to making the BPA Energy Star® CFL Coupon Rebate Program available to Seattle City Light retail customers.

Subsequently Seattle City Light entered into two primary contract mechanisms with the BPA for power sales that provide financial support to the utility for its energy saving activities. The first contract is a power purchase agreement whereby the BPA buys a 9 aMW annual block of load reduction from City Light at a fixed rate per kilowatt-hour. This Conservation Augmentation Agreement, initiated late in 2001 and extending for two years, was reached to reduce City Light power purchases from the federal power authority, based upon City Light's ongoing conservation programs. The BPA agreed to provide approximately $26.6 million if the annual incremental load reduction goal is reached in each of the two contract years (federal fiscal).

The utility did meet the goal in fiscal year 2002 (receiving $20 million in power purchase payments during calendar year 2002), and anticipates doing the same in 2003 (for payment of $11 million during calendar year 2003). Conservation augmentation revenue from the BPA is being deferred by City Light, amortized over the estimated ten-year life of the BPA 'Block and Slice' power purchase agreement. These funds are not reflected in Table 9 or Figure 10, which show BPA funds aggregated from the individual conservation program entries in SECTIONS II-IV of this report.

The second contract between the BPA and City Light is also tied to an existing power sales agreement. The Conservation and Renewables Discount provides a discount to the City Light's federal power purchase if the utility makes investments in energy efficiency or renewable energy resources. This contract was initiated in early 2001 and can extend through the BPA federal fiscal year 2006. The total credit available to City Light over the contract period is about $10.5 million and the credit is applied to the monthly BPA power bill. The credits are recorded

$10.5 million and the credit is applied to the monthly BPA power bill. The credits are recorded by City Light as wholesale power revenue. Through the end of 2002, $7.1 million in credit has accumulated, and the utility anticipates exceeding the threshold amount in 2003. These funds are also not reflected in Table 9 or Figure 10.

The history of BPA conservation funding for individual City Light programs is clear from Table 9. In total, BPA conservation program funding from 1981 through 1999 comprised 22% of the total conservation programs budget over the past two decades, 25% of actual *total conservation* expenditures, and 29% of actual *direct program-delivery* expenditures (excluding general support costs).

While City Light has received over $94 million in BPA conservation funds, the bulk of this was provided during two discrete periods. During 1981-1983, 43% of City Light's conservation program expenditures were covered by BPA funds; during 1992-2000, BPA funds comprised 40%. Over the intervening eight-year period, BPA funding reimbursed only 19% of City Light expenditures for conservation.

Other partners besides the Bonneville Power Administration have provided funding for Seattle conservation resources. The Lighting Design Lab (*LDL*) is a regional facility budgeted and operated by Seattle City Light. In 1987-2002 outside grants were received from other utilities and organizations to partially support the *LDL*. From 1989 through 2002, these non-BPA revenues supporting the Lighting Design Lab have totaled $3,963,064, including in-kind grants of products. Beginning in 1998, the Lab's operation costs have been funded 70% by the Northwest Energy Efficiency Alliance of regional utilities and agencies, while Seattle City Light continues to provide about 23% in operational support.

Table 9

BPA CONSERVATION PROGRAM FUNDING BY YEAR (1)

Year	*Residential Programs*	*Commercial Programs*	*Industrial–Government Programs*	*Total All Programs*	*BPA Funding as % of Total SCL Program* (2) *Expenditures*
1977	$0	$0	$0	$0	0.0%
1978	0	0	0	0	0.0
1979	0	0	0	0	0.0
1980	0	0	0	0	0.0
1981	50,762	40,073	0	90,835	2.7
1982	3,599,926	103,589	1,109,813	4,813,328	49.5
1983	4,539,191	268,127	2,219,626	7,026,944	48.6
1984	0	0	0	0	0.0
1985	159,590	0	80,663	240,253	2.4
1986	2,677,085	87,039	54,624	2,818,748	26.8
1987	601,761	471,201	0	1,072,962	11.0
1988	484,673	1,666,837	0	2,151,510	20.2
1989	705,689	2,208,014	0	2,913,703	27.7
1990	463,381	2,160,570	0	2,623,951	23.8
1991	777,040	3,100,055	0	3,877,095	32.9
1992	2,093,095	3,789,011	137,912	6,020,018	43.0
1993	2,591,091	9,576,614	504,456	12,672,161	63.5
1994	3,026,752	10,206,948	593,056	13,826,756	59.3
1995	4,143,574	8,098,110	1,367,049	13,608,733	53.6
1996	2,111,635	7,066,353	1,154,526	10,332,514	57.1
1997	1,440,949	3,528,591	508,336	5,477,876	39.8
1998	386,442	2,505,684	169,707	3,061,833	17.2
1999	38,750	1,479,310	162,000	1,680,060	9.4
2000	0	0	0	0	0.0
2001	4,273	0	0	4,273	0.0
2002	17,898	0	0	17,898	0.0
Total	**$29,913,557**	**$56,356,126**	**$8,061,768**	**$94,331,452**	**29.2%**

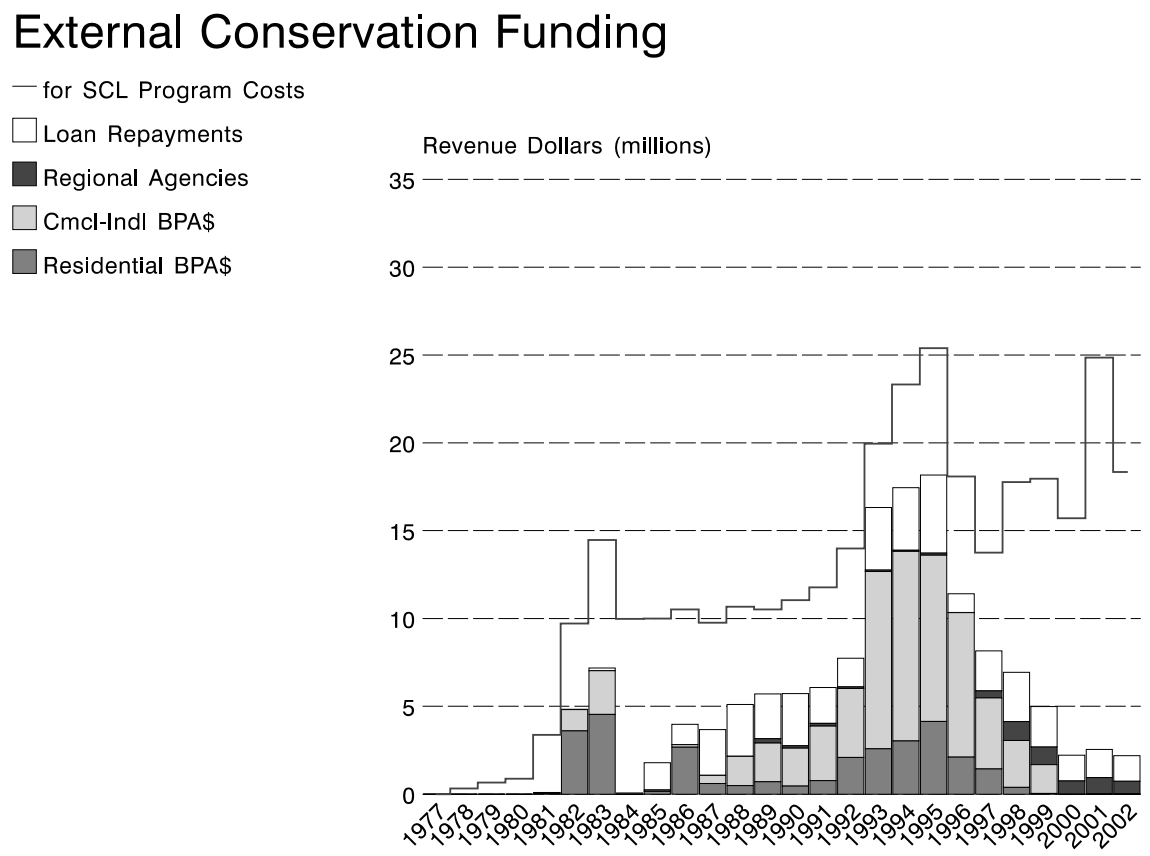
Notes

1. The BPA conservation program funds are aggregated from the conservation program entries in Sections II-V of this report. These amounts may differ from those shown in financial statements because the revenues reported by program are based on invoices sent to the BPA during each calendar year. General accounting statements may include additional amounts accrued at year-end which were not yet invoiced.

2. Program expenditures from Table 8 (fifth column), the denominator for this percentage, include only direct program costs and exclude support services.

3. Funds supplied by the BPA are received by Seattle City Light and recorded by Work Order Number in the Seattle Financial Management System (SFMS) as revenues by program.

Figure 10



Notes

1. External funding for individual programs is comprised not only of monies received from the Bonneville Power Administration and other regional agencies, but also of utility cost repayments from customers who participated in three residential weatherization programs. These funds are compared to Seattle City Light program delivery expenditures for all 30 programs to illustrate the portion of conservation costs reimbursed by the region and participants. The difference has been funded through customer rates and, more recently, through municipal bonds for capital improvements.

Besides the BPA and NEEA, external funding partners for the Lab over the years have included B.C. Hydro, California Energy Commission, Idaho Power, Natural Resources Defense Council, Northwest Conservation Act Coalition, Northwest Power Planning Council, Pacific Power, Puget Sound Power and Light Company, Snohomish Public Utilities District No.1, Tacoma City Light, University of Washington, Washington State Energy Office, and Washington Water Power.

The Northwest Energy Efficiency Alliance has also lent support to City Light's Retail-Wise Lighting and Appliance programs. The value of this support was estimated at $2,171,600 in 1997-2002, chiefly in the form of informational services, sales promotion, and contractor management of manufacturer rebates.

The story of external funding for conservation savings acquired by Seattle City Light, in relation to utility spending, is told in Figure 10 (in nominal dollars). Besides BPA and external funding, revenues received from participating customers have also offset residential program costs. Table 10 describes cost offsets for three conservation programs: Home Energy Loan, Multifamily Conservation (Standard-Income and Common-Area Lighting), and Warm Home.

Two of these programs were designed to receive from customers excess payments that were passed through to contractors, to cover job costs unrelated to energy benefits (e.g., upgrade to the aesthetic quality of window replacements). From 1981 through 1996 these excess payments totaled about $8.9 million, amounting to 13% of total expenditures in the named programs (17% of measure costs only). Excess payments in these programs comprised 6% of residential program expenditures overall. This program mechanism was discontinued by 1999.

Revenues are also received from customer repayments, either up front or on loan contracts established by the same set of programs. Seattle City Light has financed loans to residential customers since 1981 through the Home Energy Loan Program (HELP), since 1986 through the Multifamily Conservation Program for Standard-Income buildings, since 1993 through the Multifamily Common-Area Lighting Program, and since 1994 through the Warm Home Program. City Light discontinued new loan processing in 1998. Table 10 presents the total expenditures for these financing programs, along with BPA funding, customer excess cost payments, customer loans financed, and loan repayments to date.

As Table 10 shows, 26% of expenditures in these programs paid for program delivery, customer services, and other program administration; the remainder was for measures installed. Participating customers paid excess costs averaging 11% immediately upon project completion. Another 51% was incurred as debt to Seattle City Light (payable immediately or financed for customers through Utility loans). Thus, over the past 22 years, participating customers paid City Light directly for 62% of the cost of these three residential weatherization and lighting programs.

Table 10

OTHER SOURCES OF REVENUE FOR LOAN PROGRAMS BY YEAR (1)

Year	*Program Expenditures Total* (2)	*Program Expenditures for Admin.* (2)	*BPA Funds for Admin. & Measures*	*Participant Excess Cost Payments* (3)	*Participant Debt Financed*	*Participant Debt Re-Payments* (3)	*0Participant Total Costs To Date* (3)
1981	$421,428	$163,479	$0	$68,900	$189,049	$4,162	$73,062
1982	2,875,876	390,572	746,937	663,400	1,217,687	24,012	687,412
1983	5,503,095	1,032,068	1,522,982	1,118,035	2,077,530	158,870	1,276,905
1984	3,705,496	1,164,754	0	678,200	1,862,542	67,887	746,087
1985	3,751,714	1,053,891	118,430	720,200	1,897,968	1,552,951	2,273,151
1986	4,995,585	1,158,908	1,518,391	974,721	1,614,810	1,160,240	2,134,961
1987	3,488,238	1,020,090	40,072	561,786	1,875,660	2,604,194	3,165,980
1988	3,882,342	1,034,322	29,088	374,722	2,471,788	2,954,848	3,329,570
1989	3,214,797	1,015,351	73,532	524,353	1,675,093	2,549,125	3,073,478
1990	4,395,551	940,450	30,028	586,547	2,868,554	2,970,149	3,556,696
1991	3,815,632	877,989	108,395	792,818	2,144,825	2,033,875	2,826,693
1992	2,860,940	815,725	287,533	428,180	1,415,540	1,626,533	2,054,713
1993	5,470,517	1,571,192	383,122	544,059	3,028,674	3,564,954	4,109,013
1994	6,966,675	1,646,238	461,872	318,012	4,545,002	3,558,342	3,876,354
1995	8,843,317	1,630,085	3,198,719	261,727	4,064,466	4,440,932	4,702,659
1996	4,155,295	1,224,668	1,479,912	272,143	1,178,572	1,064,557	1,336,700
1997	2,966,434	871,069	834,371	0	1,260,994	2,279,366	2,279,366
1998	2,524,349	750,253	35,451	0	1,738,645	2,803,620	2,803,620
1999	2,399,439	846,223	0	0	1,553,216	2,306,792	2,306,792
2000	1,950,034	886,940	0	0	1,063,094	1,468,189	1,486,189
2001	2,168,627	790,531	0	0	1,378,096	1,595,954	1,595,954
2002	2,135,617	804,224	0	0	1,331,393	1,465,272	1,465,272
Total	**$82,490,998**	**$21,689,022**	**$10,868,835**	**$8,887,803**	**$42,453,198**	**$42,254,825**	**$51,142,628**
Pct	**100%**	**26%**	**13%**	**11%**	**51%**	**51%**	**62%**

Notes

1. Seattle City Light received revenues from both the Bonneville Power Administration and customers participating in three conservation programs: the Home Energy Loan Program, Multifamily Conservation Programs (Standard-Income and Common-Area Lighting), and Warm Home Program. Funds received from the BPA were recorded in the Seattle Financial Management System (SFMS) as revenues by program; loan repayments are not, but rather go into the general revolving fund.

2. Program expenditures are aggregated from the conservation program entries in SECTION II and SECTION IV of this report. Shown are total program expenditures, and expenditures for administration only (a subset of total expenditures).

3. Other sources of revenue include excess payments from customers to Seattle City Light at the time of contract initiation; immediate repayment to City Light for measures installed; and loan payments made over 5 to 10 years for measure costs financed after excess payments and BPA reimbursements have been credited to the customer's project. Reported customer repayments reflect revenues received by City Light to date; the stream of payments on recent loans continues, with $198,373 outstanding at the end of 2002 (the lowest level since 1981).

Data are not readily available on the present value of past loans and repayments in current year dollars. Thus, while it is inaccurate to report repayment of prior year expenditures in nominal dollars, the following financial information is presented for illustration. These data provide a sense of the degree to which the financed programs have repaid the ratepayers for bearing the costs of loans through City Light's borrowing authority.

Participating customer contracts have resulted in the repayment during 1981-2002 of $42 million (nominal dollars), amounting to 69% to date of measure costs in these loan programs (or 51% of total expenditures including administrative costs).

The amount of program expenditures repaid by participating customers has grown with time as more loan contracts are paid off. To date, customers have repaid 99.5% of all amounts financed by loans through this set of programs. These repayments to date comprise 24% of residential program expenditures overall (including non-loan programs).

Meanwhile during the past 22 years, BPA funding reimbursed 13% of expenditures in the affected loan programs, and 17% of residential expenditures overall. Thus just over half the cost of all residential programs ($95,402,176) has been borne indirectly by Seattle City Light ratepayers to date.

Total Residential Expenditures 1977-2002	$176,656,734	100%
▪ Bonneville Reimbursements	(29,913,557)	17%
▪ Costs Beyond Program Limits (excess)	(8,887,803)	5%
▪ Customer Debt Incurred to the Utility	(42,453,198)	24%
Net Cost to Seattle City Light & Ratepayers	$ 95,402,176	54%
Loans Outstanding December 31, 2002	$ 198,373	

Conservation Plan Productivity by Year

After 15 years of operating successful conservation programs, Seattle City Light wrote the *1992 Conservation Implementation Plan (CIP)* outlining a strategy for acquiring 100 aMW of new programmatic electric energy savings over the upcoming decade. Since 1997, City Light's conservation programs have operated under the direction provided by the *Energy Management Services (EMS) Plan*, which replaced the CIP. The EMS Plan was developed in response to a variety of industry developments including an evolving, deregulated, competitive business environment and the curtailment of conservation funding from the Bonneville Power Administration. The EMS Plan outlined a portfolio of conservation programs and services designed to meet several city-wide policy directives, including revised annual energy savings goals of six average megawatts (6 aMW) of load reduction continuing through the period 1997-2002. The Seattle City Council endorsed the EMS Plan on September 26, 1996, with the adoption of Resolution 29427. This resolution highlighted specific City Council directives beyond the annual savings goals, including the following:

- Offer comprehensive energy management services
- Support neighborhood-wide integrated resource conservation
- Offer an industrial DSM pollution control service
- Provide leadership in the Municipal Resource Conservation Program
- Deliver services in collaboration with other City Departments

Since 1997, annual goals have been revised slightly year-by-year to accommodate regional market transformation activities, new service offerings, and constraints on budgets and funding. City Light's Energy Management Services Division has the responsibility of carrying out the goals established in the EMS Plan. The primary directive of the Plan is to acquire cost-effective energy conservation.

Policy Direction and Planning

While other utilities stepped back from investments in conservation during the 1990s, City Light was visionary in keeping its conservation infrastructure and program delivery system in place, recognizing the long-term value of the conservation resource. In 2000 the City reviewed current utility efforts with an eye to doubling its ambitious conservation goals as soon as possible. In 2001 the utility acted expeditiously to accelerate conservation acquisition.

In April 2000, the City of Seattle adopted an *Earth Day Resolution* initiating the City's commitment to reducing greenhouse gases. City Light is directed to meet growing Seattle's electric needs with no net increase in greenhouse gas emissions, by using cost-effective energy efficiency and renewable resources to meet as much load growth as possible.

In June 2000, the Energy Management Services Division completed a *Conservation Potential Assessment* to identify the cost-effective energy conservation potential within its service territory. Aided by the Northwest Power Planning Council, this effort produced the following key findings.

- Approximately 180 to 260 average megawatts (aMW) of cost-effective energy conservation is available over the next two decades. This potential is available in all sectors, roughly proportional to energy sales.
- The greatest potential is in the commercial sector. By end use, lighting offers the greatest potential, followed by space heat, HVAC (heating, ventilation and air conditioning), and refrigeration.
- The majority of energy savings are in 'lost opportunities', which are only cost-effective or feasible to acquire at the time of purchase or construction.

In September 2000, Seattle City Light published a *Strategic Resource Assessment* to outline options for meeting load growth over the next ten years. It committed to meet load growth consistent with the 2000 Earth Day Resolution, using energy efficiency and renewable resources. Seattle considers conservation its first-priority electric resource. As a result, City Light doubled its current conservation goal for the upcoming decade to acquire another 100 aMW of energy savings. The acceleration strategy doubled annual conservation goals from 6 aMW to 12 aMW and raised budgets from $18 million to $24 million. Meanwhile the utility determined to acquire an additional 100 aMW from renewable resources such as wind-power over the same ten-year period.

Program Review

Also in 2000, City Light contracted an independent and comprehensive review of demand side management accomplishments during the preceding three years, and of program efficiency in the current year. In general the consultants found that EMS Division activities are operating well. Many of their recommendations were either already under development or have been considered as the Division moved into 2001 putting together its Conservation Acceleration package.

The *Conservation Program Review*, completed around year-end 2000, found that the cost and energy savings data in the annual ENERGY CONSERVATION ACCOMPLISHMENTS report are accurate with respect to City Light data tracking systems. For many programs, savings estimates are conservative and may understate the true accomplishments. This is because the estimates often include one or more factors that decrease net savings (free riders, persistence, takeback) but do not include those that would increase net savings (free drivers, spillover effects). The savings estimates for several programs were found to be based on evaluations that are dated (over five years old). Also, cost-effectiveness measures for some programs include non-energy

costs but exclude non-energy benefits, which if included would increase their apparent cost-effectiveness.

Progress Toward Acquisition Goals

From 1984 to 1991, total conservation expenditures remained stable in constant dollar (2002$) terms. The investment began to increase in 1992 with adoption of the Conservation Implementation Plan. This plan, endorsed by the Seattle City Council, called on Seattle City Light to meet all electric load growth in the next decade through conservation. A City ordinance was passed to increase the 1993 budget for immediate implementation of the Plan.

Success in meeting Plan targets is measured in two ways. Contracts signed with customers reflect commitments to bring new resources on line in 1992-2006. Annual staff productivity is managed to meet customer service and contract goals. Projects completed during a given year reflect resources put into production and now generating energy savings. It is this measure, reported in Table 11, that shows Seattle City Light's progress in capturing the conservation resource.

The Conservation Implementation Plan called for acquiring an increment of 100.0 average megawatts (aMW) in energy savings by the year 2003 (beginning in 1992, in addition to the 30.0 aMW then in production). The Energy Management Service Plan adopted in 1996 pushed that date out to 2006. Subsequently targets for 2001-2006 have been revised as depicted in Table 12. The Plan target for 2002 was to secure 9.47 aMW from projects contracted with customers (including T&D, transmission and distribution savings). This brings the 1992-2002 cumulative contracting target up to 87.66 aMW.

Energy savings secured by contract in 1992-2002 (93.79 aMW) put City Light ahead of cumulative conservation acquisition targets by 7%. Projects authorized during 2002 in all sectors are now projected to bring in approximately 58,161 megawatt-hours (MWh). This will reduce daily energy loads by 6.98 aMW, with T&D savings incorporated. In addition, non-incentive services brought in a reported 0.14 aMW from commercial and industrial customers during 2002, bringing total annual acquisitions up to 7.12 aMW. As a result, Seattle City Light achieved 75% of the 2002 goal for new conservation acquisitions. This outcome resulted from a great deal of carryover activity at the end of the 2001 acquisition push, which displaced staff and budget resources early in 2002.

As shown in Table 11, the projects actually completed and put into service during 2002 saved 73,902 megawatt-hours, or 8.87 aMW with T&D savings. Cumulative conservation production in 1992-2002 is ahead of target with acquisition goals, due to over-production in prior years. So far, implementing the Plan has yielded total energy savings of 83.93 aMW from completed projects. This impact is incremental over the 17.25 aMW still in production from pre-Plan conservation projects. The total average Utility load reduction due to programmatic conservation was 102.08 aMW in 2002.

Residential savings received a large boost in 1992 from the Home Water Savers Program, which reached into nearly every home in the City. Residential savings received another boost in 2001 from the Conservation Kit distribution described in the Neighborhood Power entry to this report, and from the Kit spillover retail purchasing described in the RetailWise entry. During 1993 through 2002, however, the most significant gains were made in the commercial sector. In 2001 the major impetus of the 10+10 Bonus Plan for business customers drove savings up during the period of the West Coast energy crisis. By both annual and cumulative standards, the energy savings acquired under the Plan are on track and ahead of schedule.

Table 11

2002 PROGRESS TOWARD CONSERVATION GOALS (1)

Customer Sector / Population	*2002 Program Participants*	*2002 Program Expenditures*	*First Year Energy Savings (MWh)*	*First Year Load Reduction (aMW)*	*Progress Toward 100 aMW Goal (aMW)*
Residential 327,130	14,102	$7,266,464	26,596	3.19	25.03
Commercial 31,420	3,069	10,296,837	38,041	4.57	50.26
Industrial / Government 2,090	11	772,427	9,265	1.11	8.64
All Sectors	**17,182**	**$18,335,728**	**73,902**	**8.87**	**83.93**

Notes

1. Actual energy savings are based on projects completed during 2002, rather than on contracted projects, for which operational statistics are routinely reported by Seattle City Light. Progress is reported for 1992-2002 (plus ESD 1991) toward the incremental goal of 100 aMW by the year 2006. Completions have been adjusted, compared to earlier reports, based on evaluation review of program records. Non-incentive services in 2002 added a reported 0.14 aMW of savings from commercial and industrial customers (not shown in table).

Table 12

SEATTLE CITY LIGHT CONSERVATION PLAN ACCOMPLISHMENTS

Year	Incremental First Year Goal (aMW)	Projects Authorized in Year (1) (aMW)	Non-Incentive Impacts (1) (aMW)	Projects Completed in Year (2) (aMW)	Cumulative Projects Completed (aMW)
1991	3.20	3.21	0.00	1.08	1.08
1992	7.90	9.63	0.00	7.12	8.20
1993	6.50	10.36	0.00	7.11	15.32
1994	7.00	10.99	0.00	8.09	23.40
1995	9.50	9.35	0.00	7.99	31.40
1996	7.68	8.23	0.24	6.91	38.30
1997	6.01	5.35	1.55	4.76	43.07
1998	6.70	6.39	0.08	7.99	51.05
1999	6.59	4.71	2.11	7.54	58.59
2000	6.59	5.22	0.14	5.64	64.23
2001	10.52	13.37	0.13	10.83	74.06
2002	9.47	6.98	0.14	8.87	83.93
2003	*7.63*	—	—	—	—
2004	*8.15*	—	—	—	—
2005	*7.63*	—	—	—	—
2006	*9.47*	—	—	—	—
1991-2002	**87.65**	**93.84**	**4.39**	**83.93**	**—**

Notes

1. A 5.2% credit for savings on transmission and distribution is included in energy savings presented as average megawatts of load reduction. The cumulative goal exceeds 100 aMW to allow for removals from service of measures with expired lifetimes. Besides the program goals cited here, City of Seattle conservation goals for 2002-2006 also include an additional 3.16 aMW annual savings from stricter new construction energy codes.

   Authorizations have been revised to reflect cancellations of new construction projects contracted in 1992-2001. New non-incentive services provided in 1996-2002 added a reported 4.39 aMW of savings from commercial and industrial customers.

2. Cumulative progress is reported for projects completed in the years 1992-2002 (plus ESD 1991), toward the incremental goal of 100 aMW by the year 2006. Completions have been adjusted, compared to earlier reports, based on evaluation review of program records. Non-incentive impacts are excluded from cumulative progress toward goals.

Program expenditures (Table 11) include City Light's payments for measures and incentives to customers, as well as the cost of delivering programs. Program costs are counted before the Utility receives reimbursements from the Bonneville Power Administration (BPA) or other outside parties. Also not counted in this measure are customer costs that accompany program participation, and indirect administrative support expenses.

The first-year energy savings acquired in 2002 came at a program cost to Seattle City Light of $20 million. Over the lifetime of conservation measures, the simple levelized program cost for measures installed during 2002 will be about 21 mills per kilowatt-hour (kWh), or 2.1¢. (A mill is one-tenth of a cent.) This calculation is based on the cost to the Utility, not adjusting for funds supplied by customers (excess co-payments and loan repayments) or by outside agencies. After these offsets, the remaining cost to the Utility will be about 19 mills per kWh, or 1.9¢.

The Energy Management Services Division serves customers in three building sectors: residential, commercial, and industrial. The simple levelized program cost of savings from work completed during 2002 is projected for the Residential sector at 26 mills per kWh. Excluding low-income programs these costs are about 20 mills. These calculations do not adjust for funding or repayment offsets.

Program costs from measures installed in 2002 will be about 22 mills per kWh from Commercial projects and 10 mills per kWh from Industrial projects. These are all *simple levelized costs*: program cost divided by the present value of lifetime energy savings, stated in 2002 dollars, unadjusted for funding or customer payment offsets.

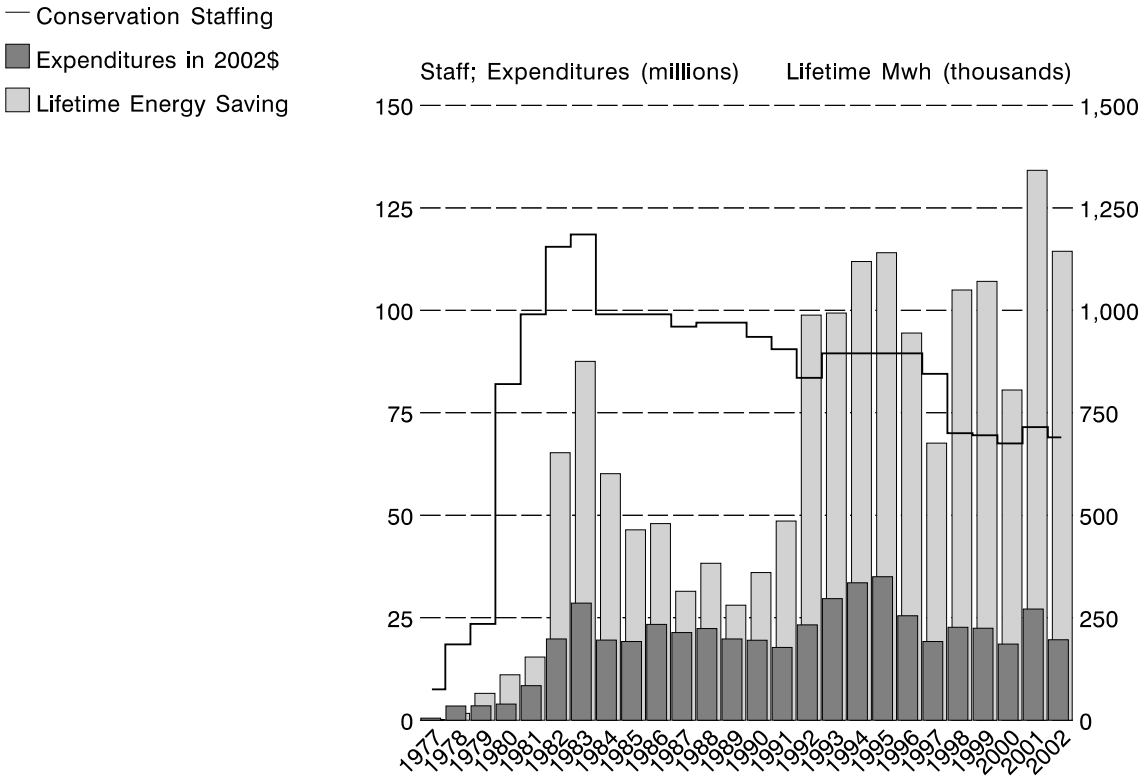
Comparisons in Figure 11 portray the productivity of the Energy Management Services Division over the years. This figure plots together three key conservation program indicators:

- Conservation staff in 'full-time equivalents' (from Table 7);
- Annual expenditures for conservation activities, adjusted for inflation (Table 8); and,
- 'Lifetime energy conservation savings' achieved per year—a measure that attributes to each calendar year the first-year energy savings, multiplied by the average residual measure life, for that year's participants.

This graph's rendition of savings differs from that of Figure 5 in one key regard. Figure 11 assigns all savings, present and future, to the year in which measures were installed, for purposes of better aligning costs and savings. This allows productivity to be evaluated per unit of investment (staff effort and budget-year dollars) in the year when measures were installed. By contrast, Figure 5 depicts cumulative energy savings spread out over the years when they have actually been realized.

Figure 11

Indicators of Conservation Achievements



Conservation Partners

Seattle City Light has worked with a variety of partners over the years to accomplish the mission of bringing energy efficiency into every home and business in the service area. Foremost among those partners has been the Pacific Northwest federal power authority, the Bonneville Power Administration (BPA).

The City Light—BPA Relationship

The BPA is a federal power marketing agency that developed and distributes power from regional hydroelectric projects. Under the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (the Regional Power Act), the BPA is responsible to provide for the electricity needs of its customers. The Act established conservation as the first priority resources to meet those needs. In 1977 the BPA promulgated its first conservation 'buy-back' provisions for utilities that purchased its power.

The power sales contract between Seattle City Light and the BPA has been structured so that whenever conservation measures are installed in City Light's service area for whatever reason, the BPA's obligation to service City Light's electricity needs is reduced. This means that BPA ratepayers receive the benefits of conservation in Seattle's service area while Seattle ratepayers forego inexpensive BPA power. For this reason the BPA has paid a substantial portion of the costs of conservation acquired by City Light during the period 1982-1999.

The BPA provided no funding for City Light's early programs from 1977 to 1981. A short-term contract was established in 1981 to fund water heating and lighting conservation programs. The BPA's subsequent funding was inconsistent and dropped off considerably in 1984 through 1991. The BPA projected energy capacity deficits by 1983, but the expected shortfall did not materialize, and in 1984 City Light and the BPA were unable to negotiate a satisfactory funding agreement.

Seattle shouldered more than its fair share of conservation costs during the 1980s due to its commitment to maintain a viable conservation resource during the period of regional surplus. City Light focused on building capability, preserving the conservation infrastructure, and mitigating lost opportunities. As the regional surplus failed in the late 1980s, the BPA once again provided funding for conservation.

Between 1985 and late 1992, the BPA provided full conservation cost reimbursement to utilities that bought all their power from the BPA, but only partial reimbursement to utilities that generated a portion of their own resources, such as City Light. Prior to late 1992 City Light received 75% reimbursement of qualifying conservation costs, or otherwise shared costs through an equivalent in-kind obligation.

The BPA amended its cost-sharing policy in late 1992. Therefore City Light expected full funding for conservation programs because they directly benefit the BPA and the region. City Light sought 100% coverage, although this ideal has rarely been achieved in practice. Beginning in the BPA fiscal year 1993, cost sharing was increased to 100% of 'qualifying' incentive payments and administration expenses. Actual BPA funding has ranged from 9% (1999) to 60% (1994) of total City Light programmatic conservation expenses.

In the early 1990s, City Light and the BPA established contracts that cover all the major program areas of City Light's Conservation Implementation Plan for energy management services. These include single-family, multifamily, appliance, commercial, and industrial energy efficiency programs.

During the 1990s energy forecasts predicted an energy balance that often dips into deficit over a 20-year horizon. The BPA's U.S. Treasury borrowing authority, however, had reached its limits. To supplement this authority, in 1993 the BPA asked City Light to borrow to provide its own capital for conservation investments. The BPA would repay the loan over a specified period of time.

In 1994 the Seattle City Council approved a Conservation Resource Acquisition and Financing Agreement (the Third Party Financing Agreement, or 3PF) between City Light and the BPA. Under the terms of this agreement, City Light agreed to provide front-end financing of its BPA-sponsored conservation programs, using the proceeds of bond issues as the main source of funding. The BPA, for its part, agreed to pay for its share of program costs with interest.

In this way the BPA could take advantage of City Light's lower tax-exempt borrowing rate and conserve its limited authorization to borrow from the U.S. Treasury. The BPA agreed to share the savings from the lower interest cost by increasing its funding of the conservation programs. This agreement became effective in June 1994. The follow-on Flexibility Agreement allowed BPA funds to be paid out in subsequent years for projects contracted prior to 1996.

BPA programs were established by contracts that traditionally provided measure specifications and limited the delivery design of utility programs. Many required receipt and acceptance inspections. BPA funding programs in which City Light has participated over the years are listed by contract below, along with the names of City Light programs which received partial funding from the BPA.

1981–1983 SHORT-TERM CONTRACT

Blanket Seattle, BPA Commercial Tank Wrap, Lighting Incentive, Street and Area Lighting Programs

1982–1983, 1985–1990	RESIDENTIAL WEATHERIZATION PROGRAM CONSERVATION AGREEMENT, ENERGY BUY-BACK PROGRAM—EBB
	Home Energy Loan, Low-Income Electric Programs; Multifamily Conservation Programs: Low-Income and Standard-Income (pilot)
1985–1986	LONG-TERM CONTRACT
	Street and Area Lighting Program
1986–1990	COMMERCIAL INCENTIVES PILOT PROGRAM CONTRACT—CIPP
	Commercial Incentives Pilot Program
1987–1992	DATA GATHERING PROJECT GRANT (Oct.87–Nov.92)
	Home Energy Loan, Low-Income Electric Programs; Multifamily Conservation Program: Low-Income
1987–1994	EARLY ADOPTER PROGRAM CONTRACT—EAP (Sep.87–Dec.94)
	City of Seattle Energy Code Major Projects Requirement, Northwest Energy Code Program
1988–1992	ENERGY SMART DESIGN ASSISTANCE PROGRAM, OPTION I UTILITY AGREEMENT—ESD (Sep.88–Sep.92)
	Energy Smart Design Program
1990–1995	RESIDENTIAL WEATHERIZATION CONSERVATION ACQUISITION AGREEMENT, WEATHERWISE PROGRAM—WEATHERWISE (Sep.90–Sep.95)
	Home Energy Loan, Low-Income Electric Programs; Multifamily Conservation Programs: Low-Income and Standard-Income
1991–1991	SUPER GOOD CENTS PROMOTIONS PROGRAM GRANT—SG¢ (Jul.91–Dec.91)
	Long-Term Super Good Cents Program
1991–1992	ENERGY SAVINGS PLAN CONSERVATION AGREEMENT—E$P (Oct.91–Sep.92)
	Energy Savings Plan Program
1991–1995	COMMERCIAL RESOURCE ACQUISITION AGREEMENT, ENERGY SMART DESIGN PROGRAM: LONG TERM CONTRACT—ESD (Sep.92–Sep.95)
	Energy Smart Design Program
1992–1995	ENERGY SAVINGS PLAN INDUSTRIAL CONSERVATION AGREEMENT—E$P (Oct.92–Sep.95)
	Energy Savings Plan Program
1992–1995	RESIDENTIAL CONSERVATION AGREEMENT—RCA (Jan.92–Sep.95)

	Energy Efficient Water Heater Rebate (Water Heaters), Home Water Savers (Showerheads), Long-Term Super Good Cents Programs (Super Good Cents), NW Energy Code Program (Washington State Options)
1993–1995	CONSERVATION RESOURCES ACQUISITION AGREEMENT: TARGETED ACQUISITION MULTIUNIT RETROFIT PROGRAM (TARGETED ACQUISITION PROGRAM)—TAP (MAR.93–SEP.95)
	Multifamily Conservation Programs: Standard-Income and Common-Area Lighting
1994–1995	THIRD PARTY FINANCING AGREEMENT—3PF (Jun.94–Sep.95)
	All programs excluding the Residential Efficiency Standards, General Service Efficiency Standards, and Lighting Design Lab
1995–1999	FLEXIBILITY AGREEMENT FOR PAYMENT UNDER PRIOR CONTRACTS (Sep.95–Aug.99)
	Multifamily Conservation Programs: Low-Income, Standard-Income and Common-Area Lighting; Low-Income Electric Program; Warm Home Program; Long-Term Super Good Cents Programs (Super Good Cents), Energy Code Program (Washington State Options); Energy Smart Design Program; Energy Savings Plan Program; and Lighting Design Lab
2001-2003	ENERGY STAR® LABELED COMPACT FLUORESCENT LAMP COUPON REBATE AGREEMENT (Aug.01–Sep.03)
	Coupon Rebate Programs (reported in Residential *RetailWise Lighting and Appliances*).
2001–2003	CONSERVATION AUGMENTATION AGREEMENT (Oct.01–Sep.03)
	Power purchase based on firm power acquired by ongoing City Light Programs: Multifamily Conservation Programs: Low-Income, Standard-Income (weatherization), and Common-Area Lighting; Low-Income Electric Program; Neighborhood Power Program; Energy Efficient Water Heater Rebates; Built Smart; WashWise and LaundryWise; Energy Smart Services Program; and Smart Business

In 1994-1995 the federal government held hearings to determine whether the BPA should continue to receive ongoing federal support. City Light began preparing to be on its own without BPA support for its energy management service programs. With the finalization of Flexibility Agreement payments in 1999, Seattle City Light conservation programs became independent of the BPA. In 2001 the two utilities agreed that Seattle City Light would make available to its retail customers the BPA Energy Star® CFL Coupon Rebate Program, for a small reimbursement of administrative expenses to City Light.

The Conservation Augmentation Agreement initiated a new phase in the relationship between Seattle City Light and the federal power authority, as this power purchase does not directly fund individual utility conservation projects or programs. Rather, based upon attainment of an overall average load reduction goal from ongoing City Light conservation programs, the utility agrees to

reduce BPA power purchases to which is entitled, in the amount of firm power acquired by completed conservation projects in each year covered by the contract.

Collaborative Action

During 2002 the EMS Division continued many partnering efforts, and also undertook a number of new collaborations. In addition to serving on several City interdepartmental teams, the EMS Division has significant ongoing and project-specific ties to other City Departments and outside entities such as other utilities, other governmental agencies, other environmental and energy efficiency-related organizations, and education institutions as well as trade allies in the private sector. These symbiotic relationships serve many benefits for participants—a principal benefit being the leveraging of resources. Examples of these City Light's ongoing collaborative action relationships include the following.

SEATTLE OFFICE OF HOUSING (OH): Administration and operation of City Light-funded low-income weatherization programs for single- and multifamily buildings. A 'utility tax windfall' resulting from passage of Council Ordinance 120322 (April 2001) allocated $1.1 million of utility B&O tax funds to additional energy conservation efforts targeted towards low-income housing providers and the facilities they operate. Activities during 2002 were coordinated with non-profit low-income housing providers through the Housing Resource Group, Human Services Coalition, Seattle Housing Authority and King County Housing Authority.

SEATTLE PUBLIC UTILITIES (SPU): Funding of the *WashWise* program to promote retail purchases of resource-efficient washing machines; funding of the *LaundryWise* program to promote resource-efficient washing machines in common area laundry rooms of multifamily buildings; multi-resource conservation referrals through the Built Smart program; implementation of the Home Utility Profile Service; and collaboration on Facility Assessments for commercial and industrial customers.

OH, SPU, AND OTHER CITY DEPARTMENTS: Delivery of *Neighborhood Power* projects, with partners also including the Mayor of Seattle, Office of Neighborhoods, Seattle Police Department Crime Prevention Unit, and Department of Parks and Recreation. Local neighborhood partners in 2002 included the Aurora Avenue Merchants Association, Phinney-Greenwood Chamber of Commerce, and Northwest District Council.

DEPARTMENT OF DESIGN, CONSTRUCTION AND LAND USE (DCLU): Work to update and revise the Seattle Energy Code (effective March 2001, with updates to follow State Code revisions in mid-2002), as well as review and approve projects for compliance. City Light staff participated in advisory committee meetings, public hearings, and expert review that was instrumental in resolving technical issues related to the new code. City Light continues to fund three positions at DCLU for energy code compliance assurance.

SEATTLE OFFICE OF SUSTAINABILITY AND ENVIRONMENT: Nominated the City of Seattle and Seattle City Light for the Gas Technology Institute's International Competition for Sustainable Urban System Design, which in 2002 gave Seattle the *Energizing America's Cities Award*.

CITY GREEN BUILDING TEAM: Work with DCLU, SPU, Parks and Recreation, and Executive Services Departments, on new City facilities. City Light staff also serve on the City Environmental Coordinating Committee.

CITY LIGHT'S ACCOUNT EXECUTIVE OFFICE AND OTHER INTERNAL UNITS: Work on creative and flexible solutions to help key customers manage energy, develop emergency use reduction plans, and get advance warning of rate hikes.

LOCAL TRADE ALLIES: Playing an integral part in the successful delivery of conservation services. Trade allies include contractors installing insulation, windows, lighting, and efficient equipment; engineers, architects, designers, and building developers; lighting and equipment specifiers; manufacturers, retailers, and suppliers.

SEATTLE CENTRAL COMMUNITY COLLEGE (SCCC): Partnership to develop and deliver in 1999-2002 a Building Operator Certificate program educating industry professionals in sustainable building strategies.

EDUCATIONAL VISITATIONS: Host to the Ukrainian Environment and Peace Group tour; to the Shenzen, China provincial government officials study tour; through a teaching exchange with the Palestine Energy Authority, via the US Agency for International Development (USAID) and American Middle East (AMID EAST).

PROFESSIONAL ORGANIZATIONS: Committee work, coordination of activities and events, and presentations to a variety of professional affiliates, including the American Energy Service Professionals, American Institute of Architects, ASHRAE 90.1, Commercial Building Industry Review, E-Source, Energy Ideas Clearinghouse, International Energy Program Evaluation Conference, Master Builders Association of King County, Natural Resources Defense Council, and Western SUN–Solar Utility Network.

LOCAL AND REGIONAL EVENTS: Playing an integral part in hosting or delivering events such as the A+E Workshop, Green Investments Forum, Pacific Coast Sustainability Roundtable, Powerful Business Conference, Rental Housing Association trade show, SODO Big Event trade show, and the University of Washington Business School's Net Impact Forum. Helped film a public service announcement with KING5-TV and John Curley of 'Evening Magazine'.

KING COUNTY DEPARTMENT OF NATURAL RESOURCES: Cooperation with Hazardous Waste, Seattle Tilth, and Master Composters/Soil Builders at local festivals; also with the Puget Sound Clean Air Agency and local jurisdictions on Climate Wise.

NORTHWEST ENERGY EFFICIENCY ALLIANCE (NEEA): Promotion of the *LightWise* and Energy Star Fixture programs and funding of the *Lighting Design Lab* through 2002; service on the Lab Steering Committee as well as the Electric League Conservation Council; attendance during 2002 at ongoing meetings with the NEEA Director to improve the working partnership that regional utilities have with the Alliance; active participation in regional market transformational efforts led by NEEA. During 2002 City Light hosted several Utility Coordination Meetings with NEEA member utilities to discuss the building commissioning components of the NEEA Commercial Building Initiative.

REGIONAL UTILITIES AND AGENCIES: Besides the BPA and NEEA, partners providing external funding to the Lighting Design Lab over the years have included B.C. Hydro, California Energy Commission, Idaho Power, Natural Resources Defense Council, Northwest Conservation Act Coalition, Northwest Power Planning Council, Pacific Power, Puget Sound Power and Light Company, Snohomish Public Utilities District No.1, Tacoma City Light, University of Washington, Washington State Energy Office, and Washington Water Power.

NORTHWEST ENERGY EFFICIENCY COUNCIL (NEEC): Partnership for delivering Building Operator Certification Training in 2000-2002.

NORTHWEST POWER PLANNING COUNCIL (NWPPC): Partnership for developing the 2001 conservation potential assessment for Seattle and the Pacific Northwest region.

ELECTRIC LEAGUE: Participation in Board and coordination of activities.

PUGET SOUND ENERGY (PSE): Funding of the *LaundryWise* program and the 'In Concert with the Environment' program for schools.

URBAN CONSERVATION ENERGY TASK FORCE AND U.S. DOE: With the National League of Cities, continue leadership and modeling for other municipal jurisdictions of transferable conservation and energy efficiency programs.

U.S. DEPARTMENT OF ENERGY (DOE): Continuing to provide financial and other support to conservation efforts not covered in City Light's budgets; also continuing are on-going symbiotic partnerships with other environmental organizations both public and non-profit. In 2002, City Light coordinated with the regional office, and supplied curriculum of the Sustainable Building Advisor certificate program for use by Federal Energy Management Program.

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Next Sections

The remainder of this report contains detailed information on specific active and discontinued conservation programs.